

普通高等工科教育机电类规划教材
机械工业出版社精品教材
北京市精品教材

JIXIE GONGCHENG ZHITU JICHU XITIJI

机械工程制图基础 习题集

第3版

陈平 万静 主编



机械工业出版社
CHINA MACHINE PRESS

VISIT...

LANZAROTE
Caliente.COM

普通高等工科教育机电类规划教材
机械工业出版社精品教材
北京市精品教材

机械制图基础习题集

第3版

**EXERCISE BOOK of MECHANICAL
ENGINEERING DRAWING FUNDAMENT (THIRD EDITION)**

主 编 陈 平 万 静
副主编 许 倩 陈 华
参 编 杨 皓 杨光辉 樊百林 李晓武



机械工业出版社

本书是《机械工程制图基础（第3版）》（万静 陈平主编）的配套用书。

本书在保留第2版风格、改正错误、整合内容、完善体系的基础上修订而成，删减了不必要的简单题型，以突出重点教学内容，新增了徒手草绘和组合体方案表达的练习题，使题目类型更具多样性。

本书主要内容包括：制图基本知识与技能，投影基础，点、直线、平面的投影，立体的投影，组合体，机件表达方法，标准件与常用件，零件图，装配图等。其编排顺序与万静、陈平主编的《机械工程制图基础（第3版）》（机械工业出版社出版）基本一致。

本书采用中英双语编写，有利于在掌握制图相关知识的同时，掌握相关专业英语词汇。

本书可作为高等工科院校（近机类、非机械类）等专业的教材，也可供其他类型学校有关专业师生和自学者使用。

The book is a supporting material of Mechanical Engineering Drawing Fundament (third edition) edited by Wan Jing.

The book was revised on the basis of keeping the second edition style, correcting mistakes, integrating contents and perfecting the system. The book cut unnecessary simple exercises to emphasize the key points of teaching materials, added exercises about freehand sketching and expression of composite solids to enhance the diversity of exercise types.

The text covers the basic knowledge and skills of drawing, basis of projection, projections of points, lines and planes, projection of solids, composite solids, representation methods of parts, standard parts and commonly used parts, detail drawings, assembly drawings and so on. The arrangement order of the book is accordance with that of the third edition of Mechanical Engineering Drawing Fundament (editor – in – chief, Wan Jing).

This book is written in both Chinese and English. It is helpful for us to master the relevant knowledge of drawing and English vocabulary.

The book can be used as a textbook for engineering college and university (closely related to mechanical engineering or non – mechanical subjects). It is also available for teachers and students of other schools majored in related subjects as well as autodidacts.

图书在版编目（CIP）数据

机械工程制图基础习题集/陈平，万静主编.—3版.—北京：机械工业出版社，2017.4
普通高等工科教育机电类规划教材 机械工业出版社精品教材
ISBN 978-7-111-56640-3

I. ①机… II. ①陈…②万… III. ①机械制图－高等学校－习题集 IV. ①TH126－44

中国版本图书馆 CIP 数据核字(2017)第 080510 号

机械工业出版社（北京市百万庄大街 22 号 邮政编码 100037）
策划编辑：赵志鹏 责任编辑：赵志鹏
责任校对：杜雨霏 封面设计：马精明
责任印制：李 飞
北京振兴源印务有限公司印刷
2017 年 5 月第 3 版第 1 次印刷
370mm×260mm·18.5 印张·229 千字
0 001—3000 册
标准书号：ISBN 978-7-111-56640-3
定价：39.80 元

凡购本书，如有缺页、倒页、脱页，由本社发行部调换
电话服务 网络服务

服务咨询热线：010－88379833 机 工 官 网：www.cmpbook.com

读者购书热线：010－88379649 机 工 官 博：weibo.com/cmp1952

教育服务网：www.cmpedu.com

封面无防伪标均为盗版 金 书 网：www.golden－book.com

前 言

本书自第 2 版 2012 年成功发行以来，受到读者好评。本次修订包括更新国标、纠正错误、整合内容等。本书主要特点如下：

1. 贯彻执行最新《技术制图》、《机械制图》国家标准。
2. 采用中英文对照形式，便于开展双语教学的师生选用。
3. 进一步加强 Inventor 软件三维建模练习。
4. 新增了综合性要求更高的练习题。
5. 新增了徒手绘图练习题，训练学生的徒手绘图能力；新增了组合体方案表达练习题，培养学生的分析表达能力。

参与编写本书的有陈平、万静、陈华、杨皓、许倩、杨光辉、樊百林、李晓武。本书由陈平和万静统稿。

由于编者水平有限，书中不足及错误在所难免，敬请广大读者批评指正。本书的编写和出版得到了北京科技大学“十二五”教材建设经费的资助。

编者

Foreword

This book has been well received by readers since its release in the second edition in 2012. The revision include the update of national standards, correcting errors, integration of content.

The main peculiarity of the book is as follows:

1. Adopt the newly Technical Drawing standard and the Mechanical Drawing Standard.
2. Write in Chinese – English to provide a favorable condition for bilingual education.
3. Further enhance the 3D modeling exercises by using Inventor software.
4. Add some exercises in relation to higher comprehensive demand for students.
5. Add freehand sketching and composite solids expressing exercises in relation to freehand practicing and expressing ability cultivation for students.

The book was edited by Chen Ping, Wan Jing, Chen Hua, Yang Hao, Xu Qian, Yang Guanghui, Fan Bailin and Li Xiaowu. It was unified by Chen Ping and Wan Jing.

Due to the limited level of editors, deficiencies and errors in the book is inevitable, please readers criticized.

The editors would like to thank the Twelfth Five – Year Teaching Material Construction Foundation of University of Science and Technology, Beijing.

Editor

Table of Contents 目 录

Foreword 前言	
Chapter 1 Basic Knowledge and Skills of Drawing 制图基本知识与技能	1
1-1 Font exercises 字体练习	1
1-2 Dimensioning exercises 尺寸标注练习	2
1-3 Drawing exercises with drawing tools 绘图工具作图练习	3
1-4 Drawing exercises with Inventor software Inventor 软件作图练习	5
Chapter 2 Basis of Projection 投影基础	6
2-1 Match pictorial drawings with three views 记物寻图	6
2-2 Draw three views according to the cabinet axonometric projections 由斜二测图画三视图	7
2-3 Draw cabinet axonometric projections according to three views 由三视图画斜二测图	8
2-4 Draw the third view according to the given two views 已知两视图补画第三视图	9
2-5 Choices 选择	11
2-6 Add missing details 补画所缺图线	12
Chapter 3 Projection of Points, Lines and Planes 点、直线、平面的投影	14
3-1 Projection of points 点的投影	14
3-2 Projection of lines 直线的投影	15
3-3 Projection of planes 平面的投影	16
3-4 Relative position of lines and planes 线面的相对位置	17
3-5 Draw the third view using line & plane analysis method 线面分析法补画第三视图	18
Chapter 4 Projection of Solids 立体的投影	19
4-1 Curved solids 曲面立体	19
4-2 Intersection of planes and solids 平面与立体相交	20
4-3 Intersection of two solids 两立体相交	23
4-4 Comprehensive exercises 综合练习	25
Chapter 5 Composite Solids 组合体	27
5-1 Add the missing details 补画所缺图线	27
5-2 Configuration of composite solids 组合体构型	28
5-3 Shape analysis method 形体分析法	29
5-4 Line & plane analysis method 线面分析法	32
5-5 Dimension of composite solids 组合体尺寸标注	34
5-6 3D modeling and drawing three views 3D 建模绘制三视图	36
5-7 Freehand drawing three views 徒手绘制三视图	38
Chapter 6 Representation Methods of Parts 机件表达方法	39
6-1 Basic views 基本视图	39
6-2 Add the missing details 补画所缺图线	40
6-3 Sectional views 剖视图	41
6-4 Cut views 断面图	46
6-5 Choices 选择	47
6-6 Dimensioning exercises 尺寸标注练习	48
6-7 Comprehensive exercises 综合练习	49
Chapter 7 Standard Parts and Commonly Used Parts 标准件与常用件	51
7-1 Specified representation of threads 螺纹的规定画法	51
7-2 Thread marks 螺纹标注	52
7-3 Screw fasteners 螺纹联接件	53
7-4 Key joints and gears 键联结和齿轮	54
Chapter 8 Detail Drawings 零件图	56
8-1 Surface texture 表面结构	56
8-2 Limits and fits 极限与偏差	57
8-3 Labeling 标注	58
8-4 Read detail drawings 读零件图	59
8-5 Freehand drawing axonometric projection 徒手绘制轴测图	61
Chapter 9 Assembly Drawings 装配图	62
9-1 Complete assembly drawings 画装配图	62
9-2 3D assembly 三维装配	64
9-3 Correct assembly drawings 装配图改错	65
9-4 Read assembly drawings 读装配图	66
Chapter 10 Other Engineering Drawings 其他工程图样	68
10-1 Pipeline engineering drawings 管线工程图	68
10-2 Foreign engineering drawing samples 国外工程图例	69

Chapter 1 Basic Knowledge and Skills of Drawing 制图基本知识与技能

1-1 Font exercises (using HB pencil) 字体练习 (要求用 HB 铅笔书写)

1

1. Chinese character exercises. 汉字练习。

字体端正笔画清楚间隔均匀排列

整齐长仿宋体技术制图姓名班级

国家标准零件比例专业装配公差螺栓齿轮

2. Letter and number exercises. 字母和数字练习。

--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--

1234567890RΦ

--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--

1-2 Dimensioning exercises 尺寸标注练习

1. Analyze dimension errors in the Fig. 1 and correct them in the Fig. 2. 分析图 1 中尺寸标注的错误，在图 2 中正确标注。

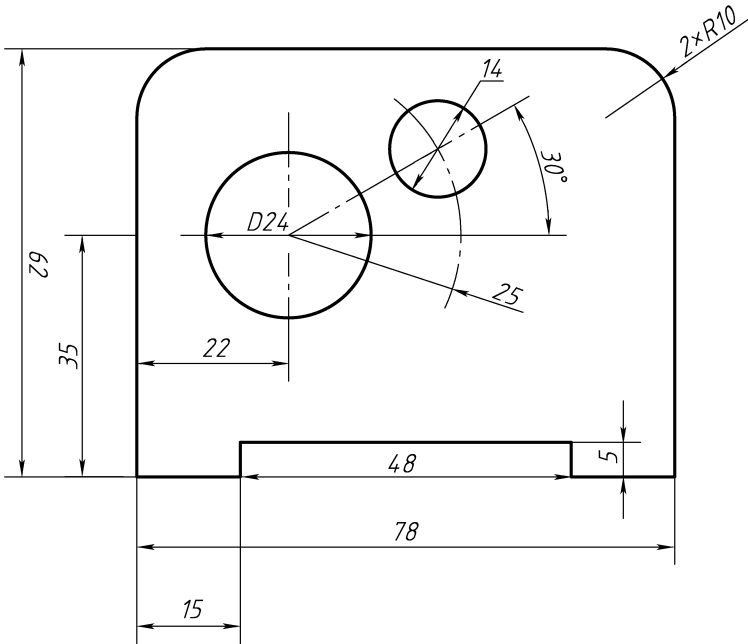


Fig. 1

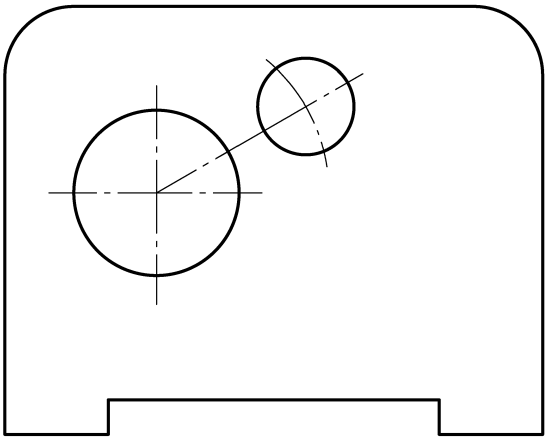
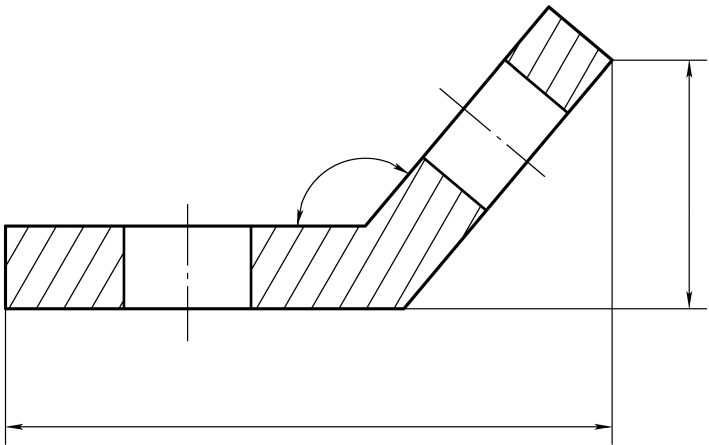
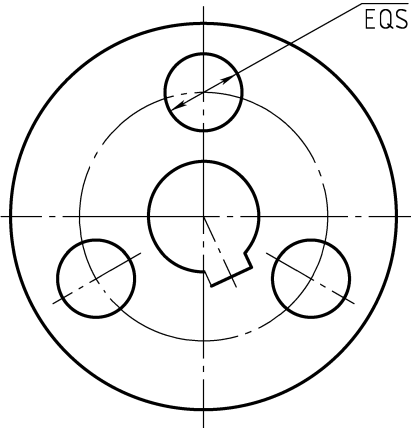


Fig. 2

2. Dimension (obtain sizes by measuring the drawing and retain the integer). 将下列图形进行尺寸标注（尺寸数值从图中量取并取整）。



Chapter 1 Basic Knowledge and Skills of Drawing 制图基本知识与技能

1-3 Drawing exercises with drawing tools 绘图工具作图练习

3

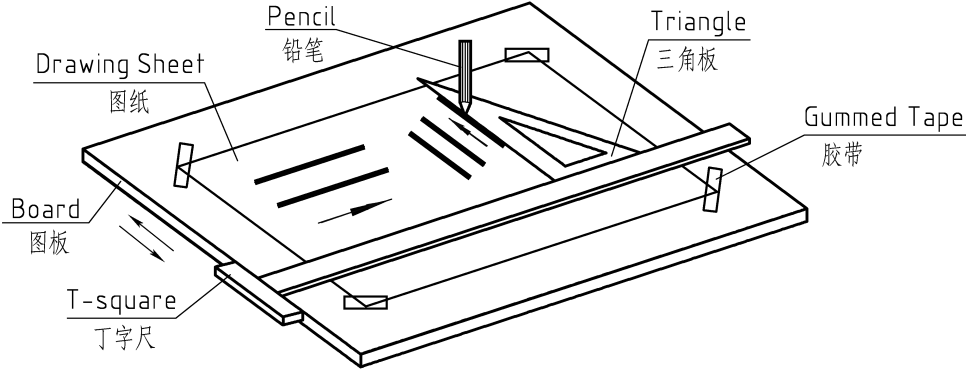
1. Requirements 要求

(1) Master the ability of the proper usage of common drawing tools (seen in Fig. 3). 掌握常用绘图工具的使用方法 (见图3)。

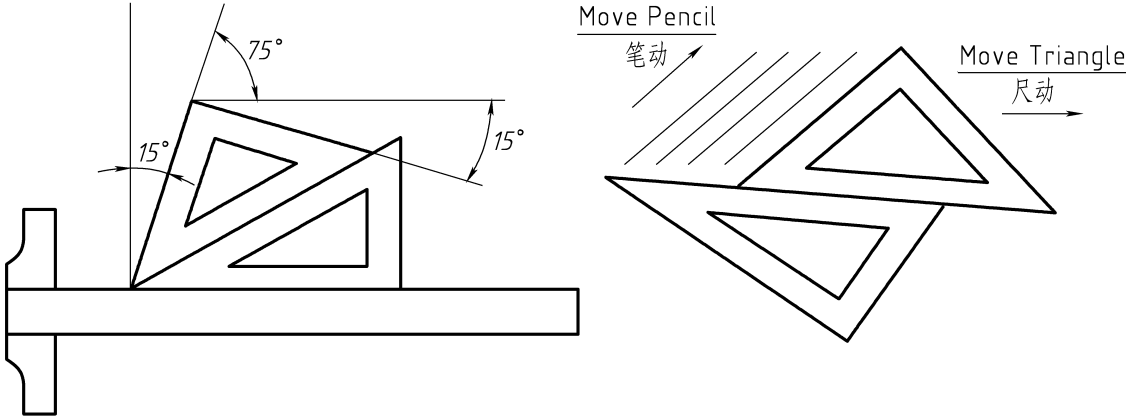
(2) Be familiar with the national standards on “Mechanical drawings” about sheet, line style, scale, lettering and dimension. 熟悉《机械制图》国家标准关于图纸幅面、图线、比例、字体、尺寸注法的规定。

(3) Learn geometric construction, drawing methods of 2D objects and dimensions. 学会几何作图以及平面图形的画法和尺寸注法。

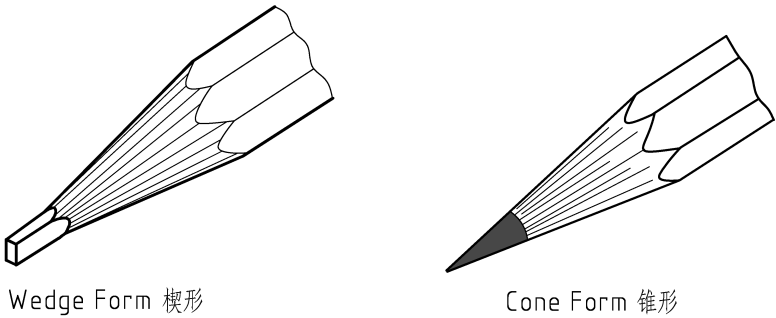
(4) Keep a serious, responsible and meticulous attitude. Each drawing should be produced with appropriate layout, beautiful lines, tidy lettering and clean drawing. 严肃认真，一丝不苟。布图匀称，图线美观，字体工整，图面整洁，养成良好的画图习惯。



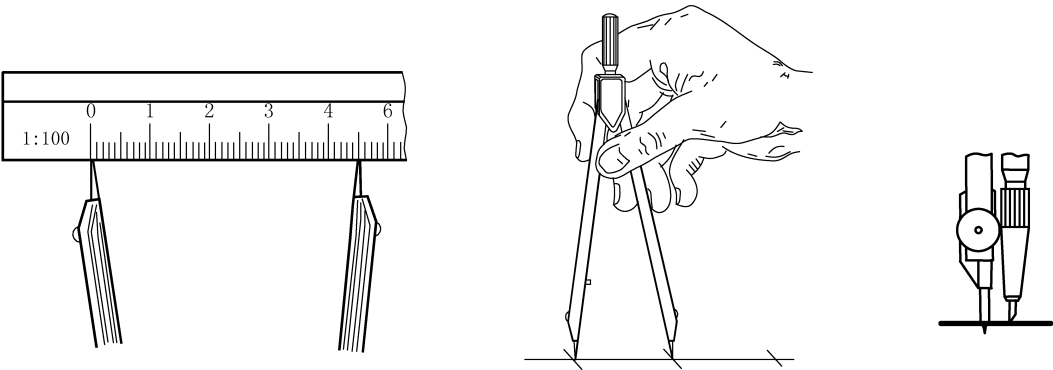
a) The use of drawing board and T-square 图板及丁字尺的应用



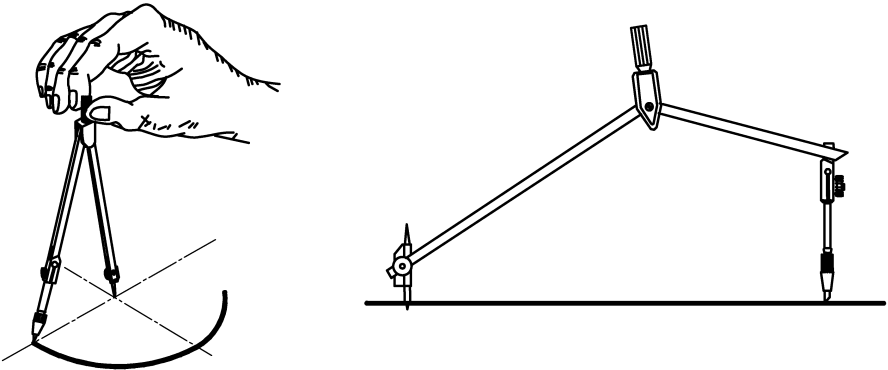
b) The use of two triangles 两块三角板的配合应用



c) Pencil sharpening 铅笔的削法



d) The use of divider 分规的使用方法



e) The use of compass 圆规的使用方法

Fig. 3 Drawing tools 绘图工具

Class

Stu No.

Name

1-3 Drawing exercises with drawing tools 绘图工具作图练习 (续)

2. Drawing procedures 作图步骤

(1) Place the drawing sheet on the lower left of the board with gummed tape (Fig.4), then draw the boundary and title block on the lower right corner of the sheet according to the national standard (Fig.5). 将图纸用透明胶带固定在图板左下方(图4),然后按标准幅面画出边框线和图框线,并在图框的右下角画一标题栏(图5)。

(2) Draw the rough sketches using thin continuous lines and then finish them using thick continuous lines. In order to improve efficiency, you had better thicken curved lines first and straight lines later, and draw the same line styles at the same time. 先用细实线打好底稿，然后加深。加深时线型应按先曲后直的顺序进行，为了提高工作效率，对于同一类线型可一起完成。

(3) Dimension, lettering and check the drawing. 标注尺寸, 书写文字, 最后对全图进行校核。

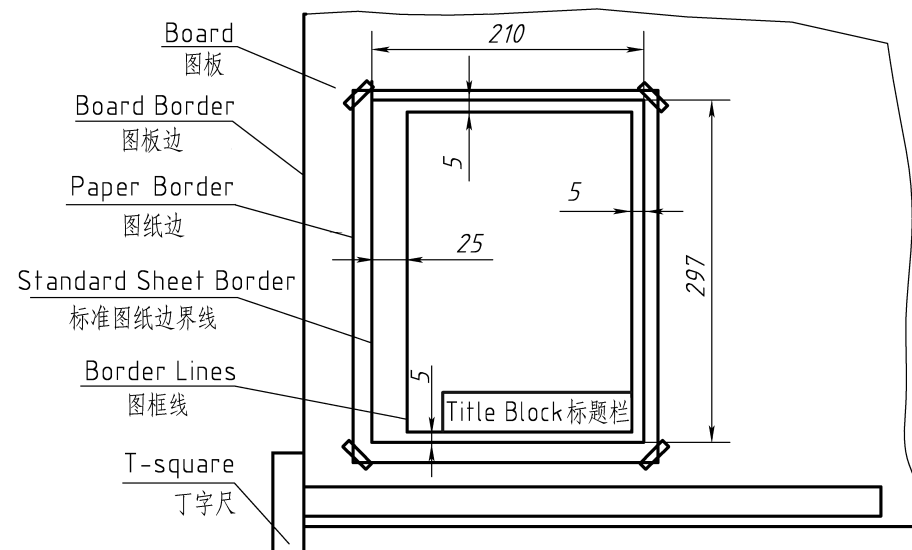


Fig. 4 Place the drawing sheet 放置图纸

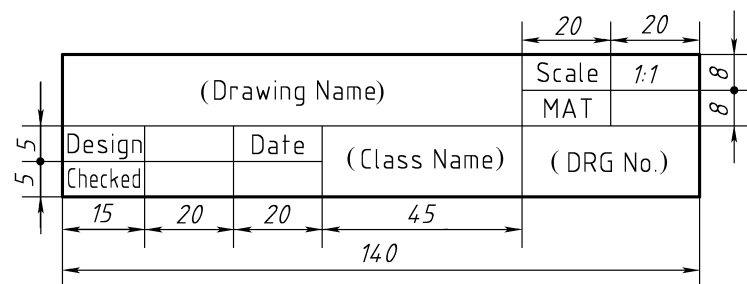


Fig. 5 Title Block 标题栏

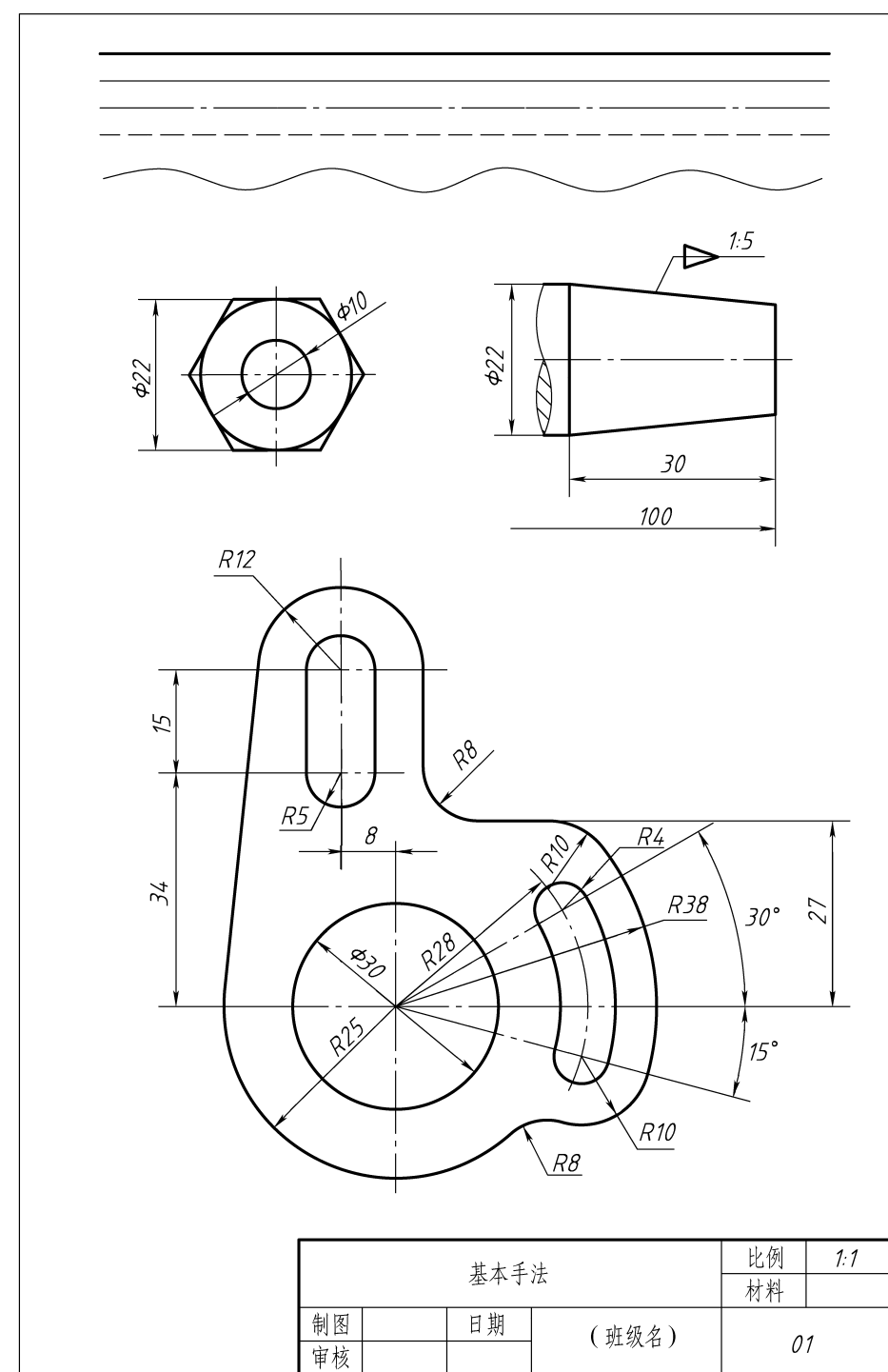
3. Exercise explanations 作业说明

(1) The workbook has been reduced because of plate – making. Finish your drawing with A4 sheet following the given scale. 本作业纸印刷制版时已经缩小，作业时要用 A4 图纸，按要求的比例作图。

(2) The dimension figure should be written with the height of 3.5mm. 尺寸数字用3.5号字书写。

(3) The letterings in the title block are as follows: DRG name and DRG No. 10mm, Class name 7mm and the rest 5mm. 标题栏内的字体大小规定如下: 图名和图号用 10 号字, 班级名用 7 号字, 其余用 5 号字。

(4) All exercises should be done using pencils. 作业全部用铅笔做。

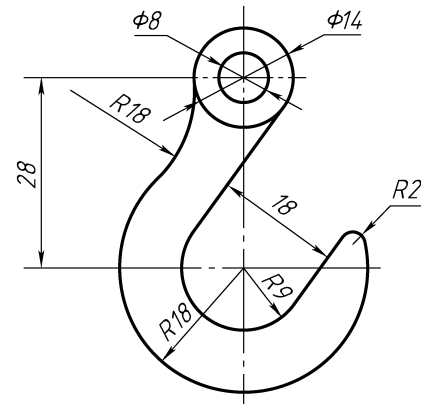


Chapter 1 Basic Knowledge and Skills of Drawing 制图基本知识与技能

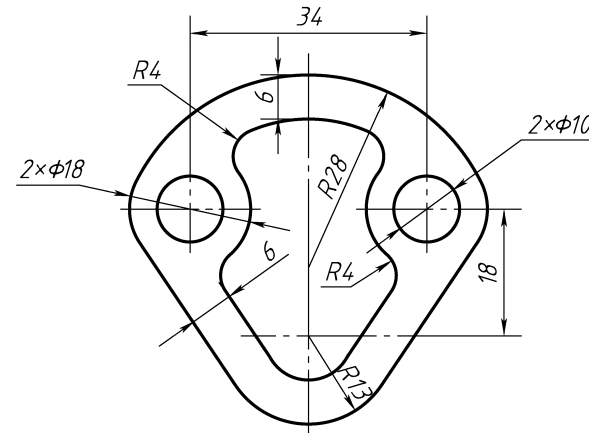
1-4 Drawing exercises with Inventor software Inventor 软件作图练习

5

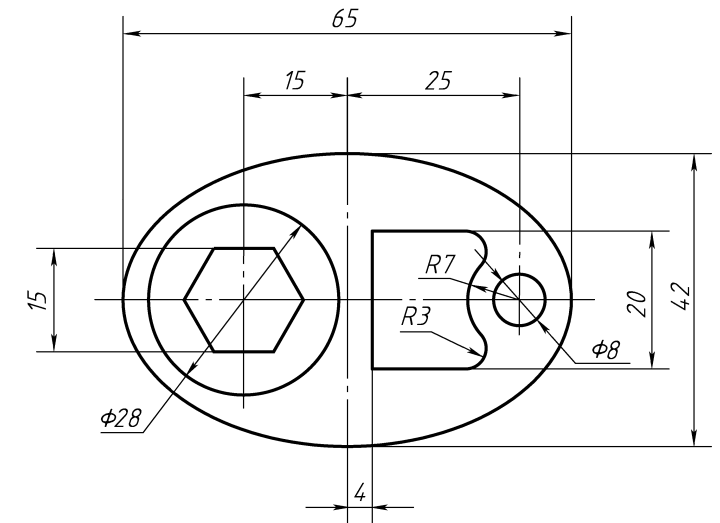
1.



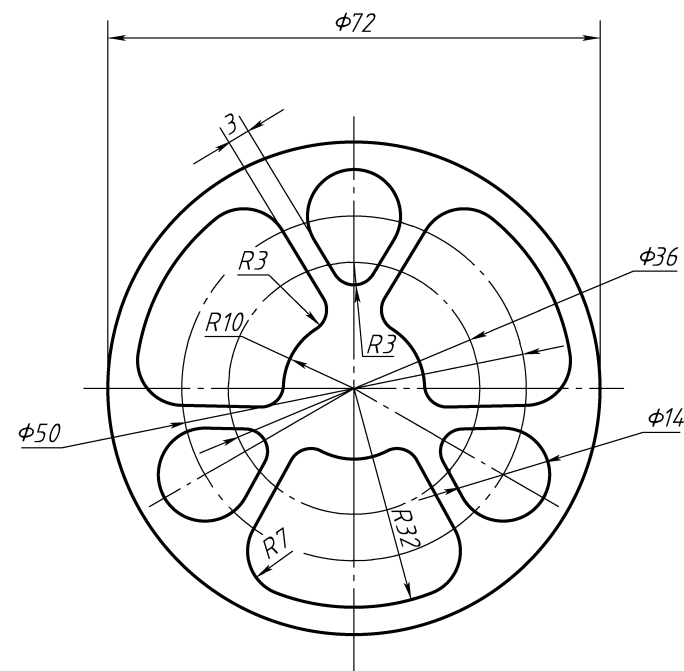
2.



3.



4.

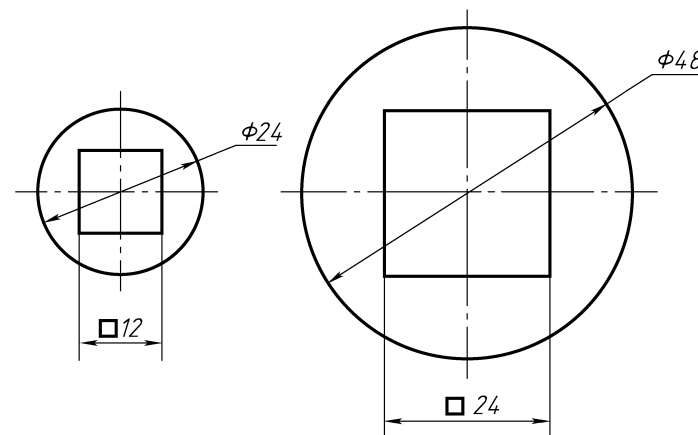


5. Create the following drawings with size variance and structure line when the diameter of circle changes. 应用尺寸变量和构造线构造下列图形，使得当直径变化时：

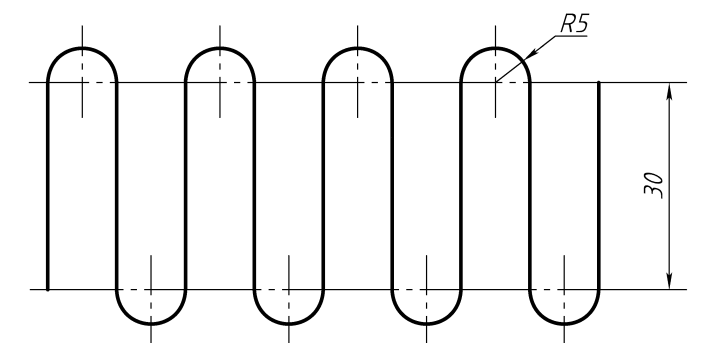
(1) The side length of square equals the radius of circle. 正方形的边长等于圆的半径。

(2) The center of square is that of circle. 正方形的中心在圓心上。

(3) The center of circle is fixed. 圆心的位置不变 (圆心固定)。



6. Create the following drawing controlled by only two sizes using structure line, geometric constraint and size constraint. 利用构造线和几何约束、尺寸约束将图形构造成为只用两个尺寸控制大小的图形。



Class

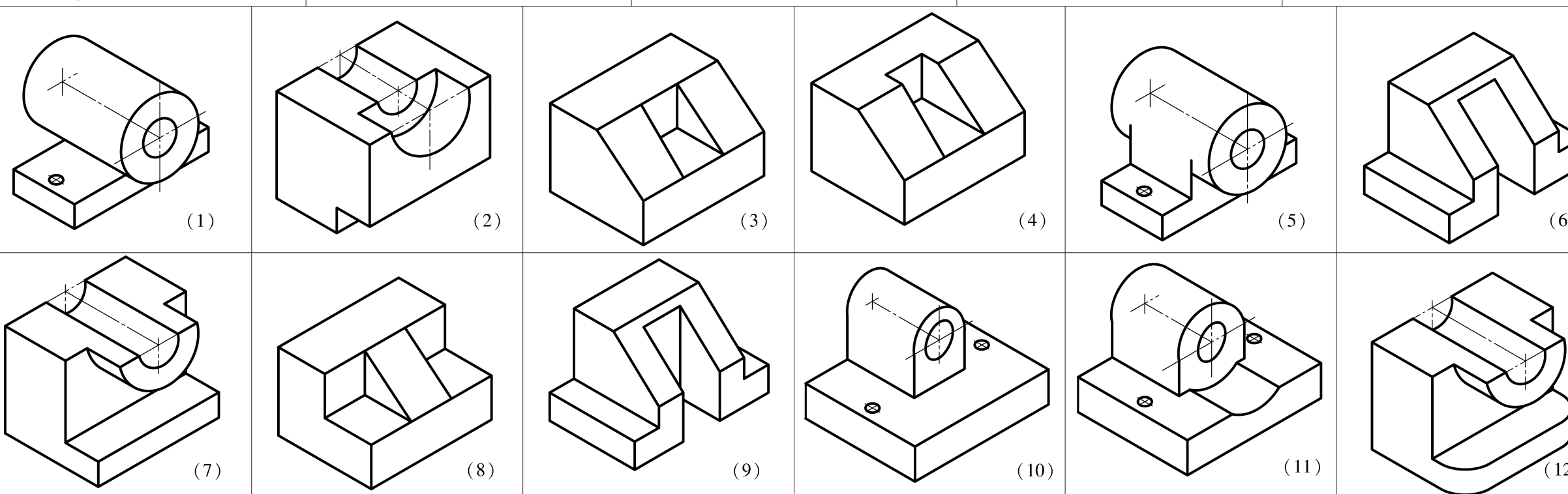
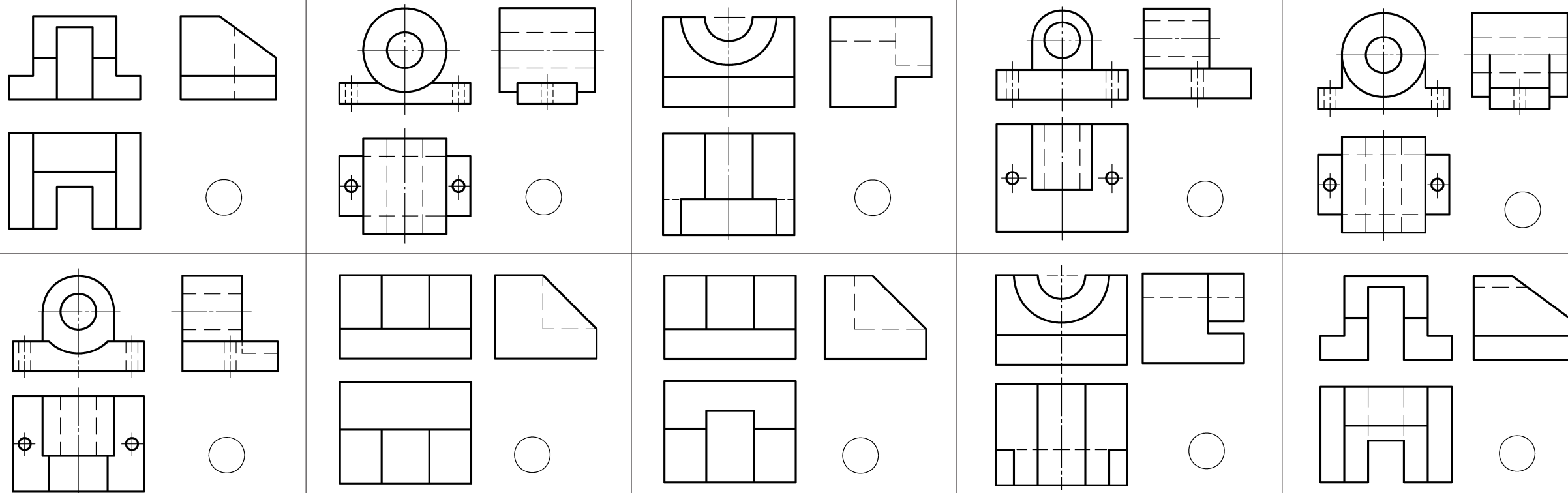
Stu No.

Name

Chapter 2 Basis of Projection 投影基础

2-1 Match pictorial drawings with three views 记物寻图 (并在圆圈内填上相应轴测图的编号)

6



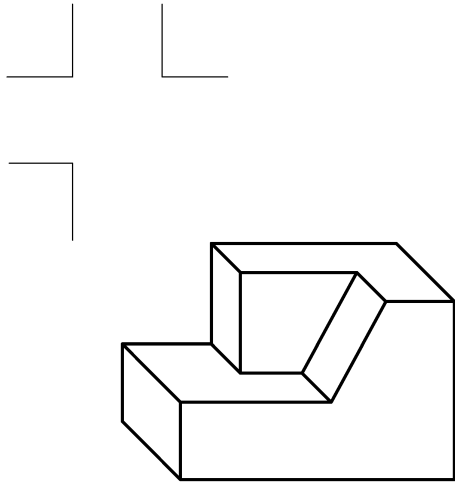
Class

Stu No.

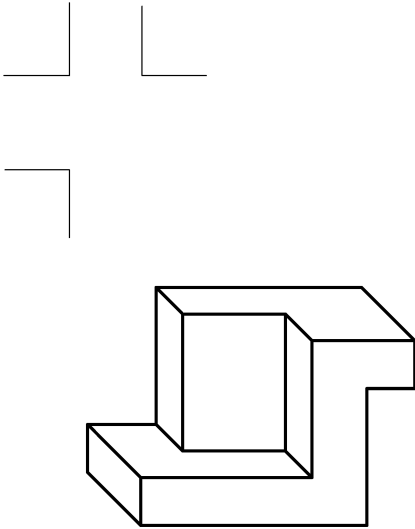
Name

2-2 Draw three views according to the cabinet axonometric projections 由斜二测图画三视图

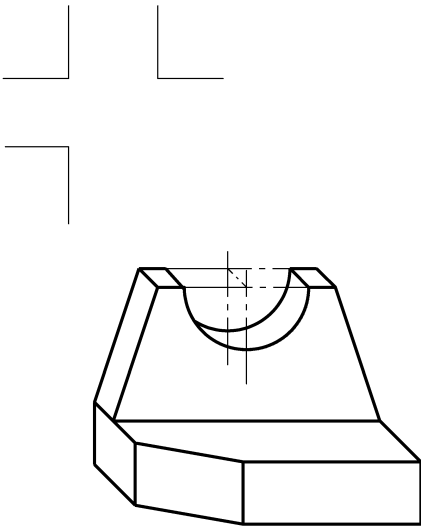
1.



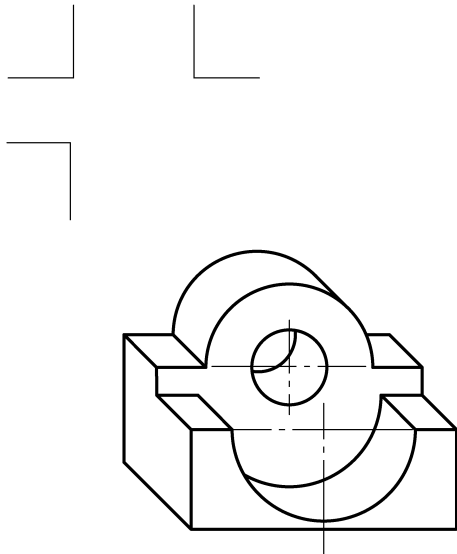
2.



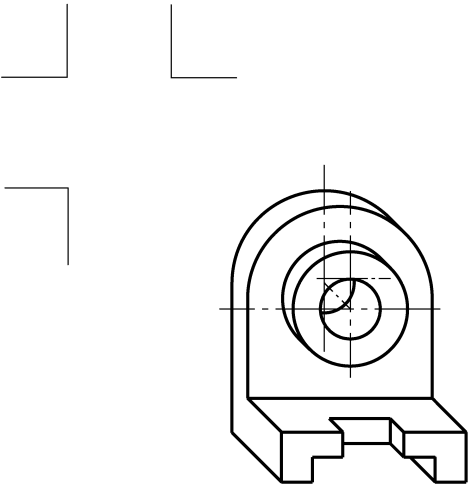
3.



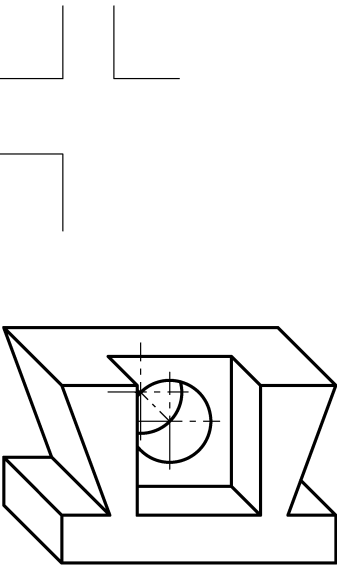
4.



5.

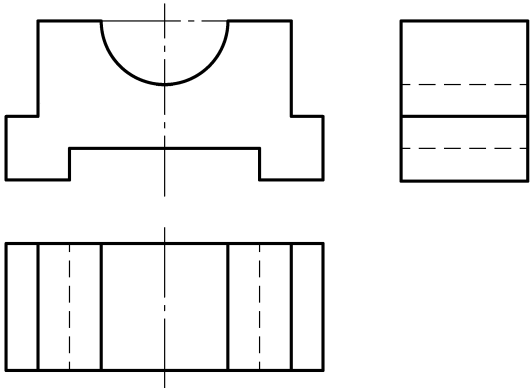


6.

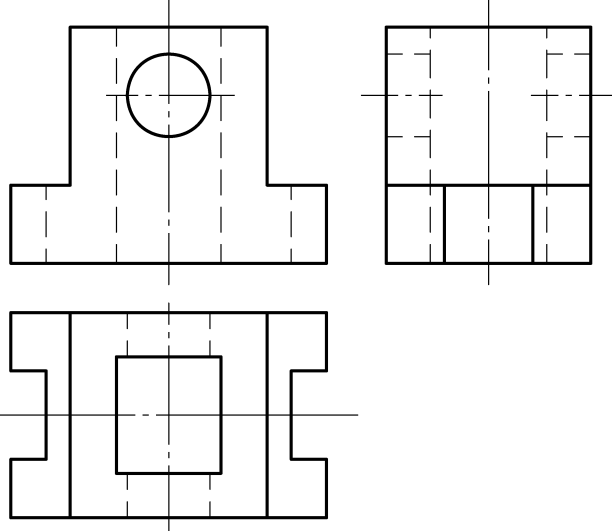


2-3 Draw cabinet axonometric projections according to three views 由三视图画斜二测图

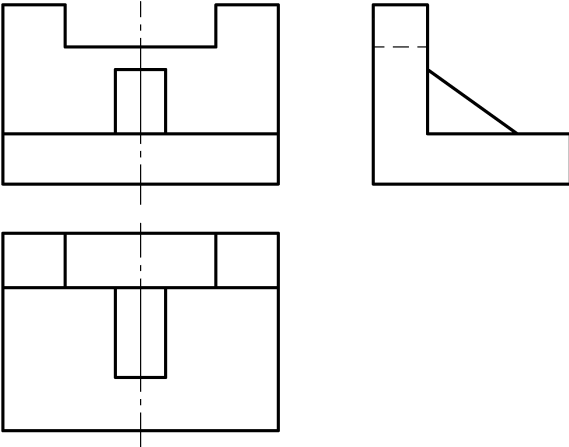
1.



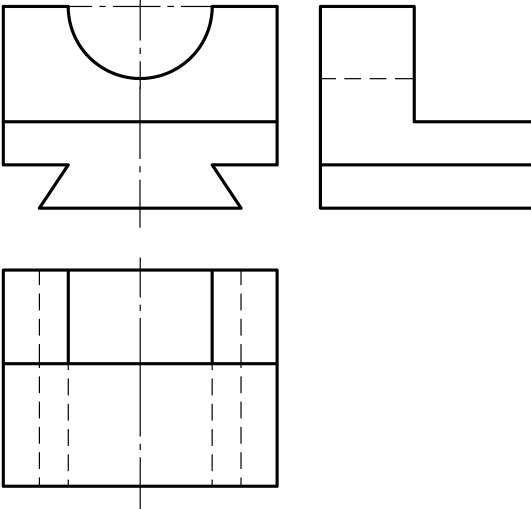
2.



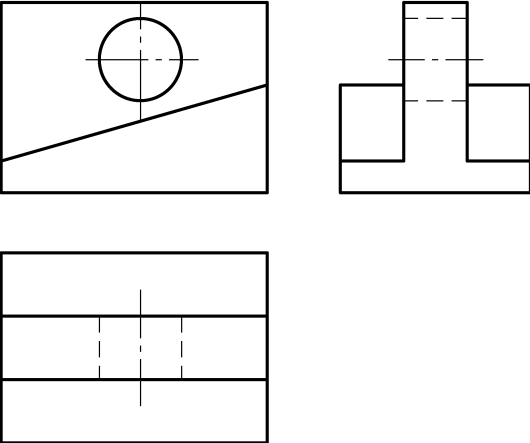
3.



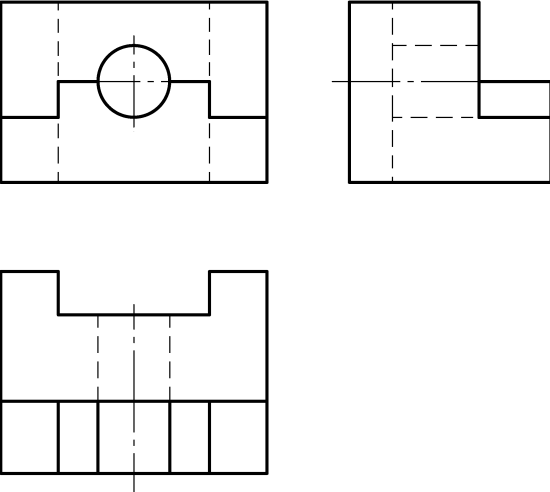
4.



5.

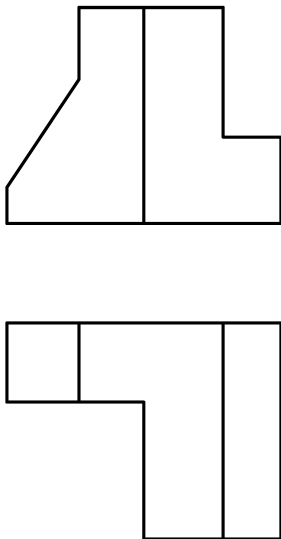


6.

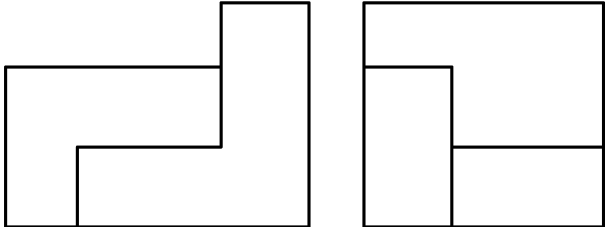


2-4 Draw the third view according to the given two views 已知两视图补画第三视图

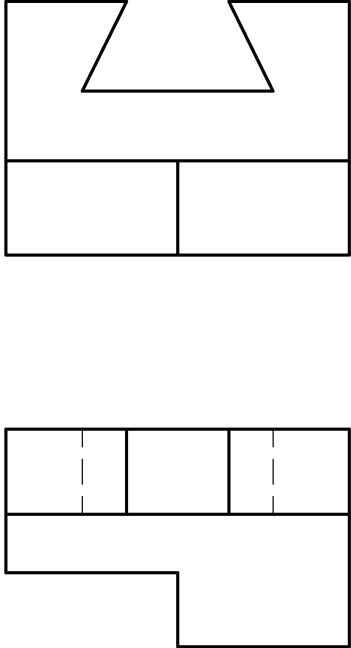
1.



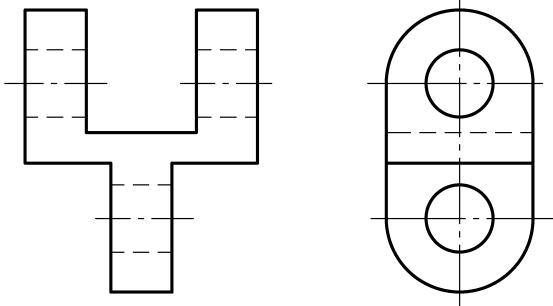
2.



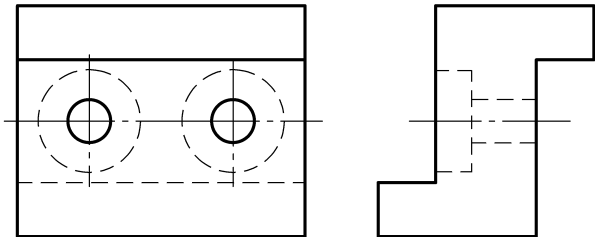
3.



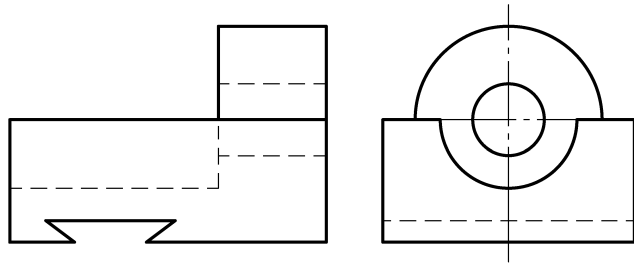
4.



5.



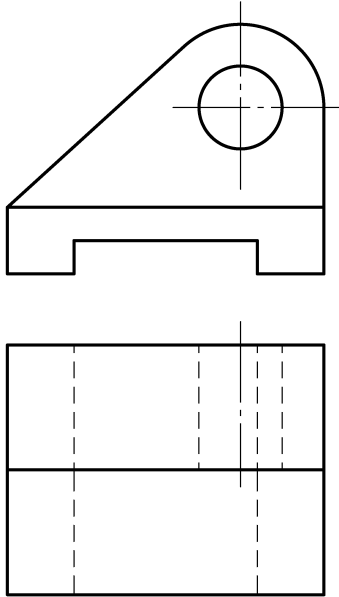
6.



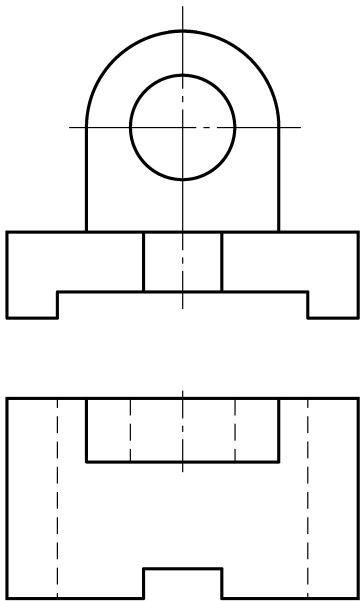
2-4 Draw the third view according to the given two views 已知两视图补画第三视图 (续)

10

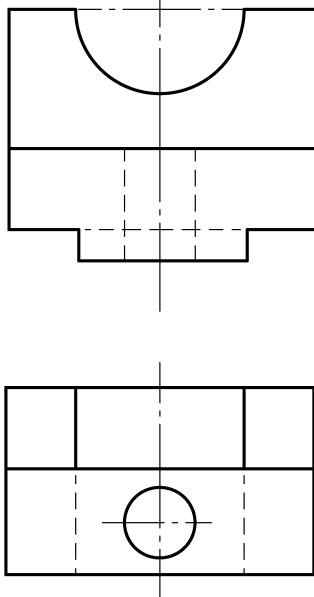
7.



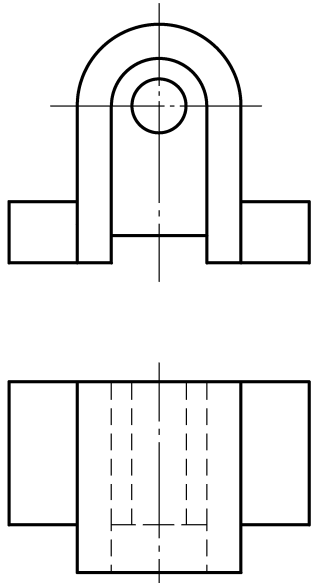
8.



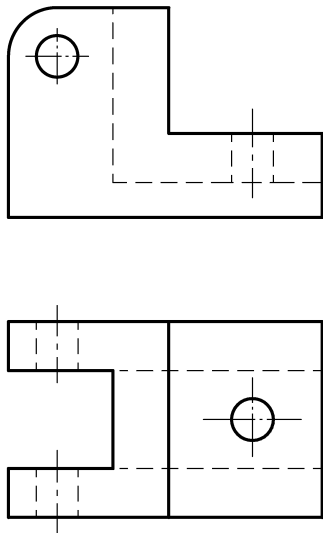
9.



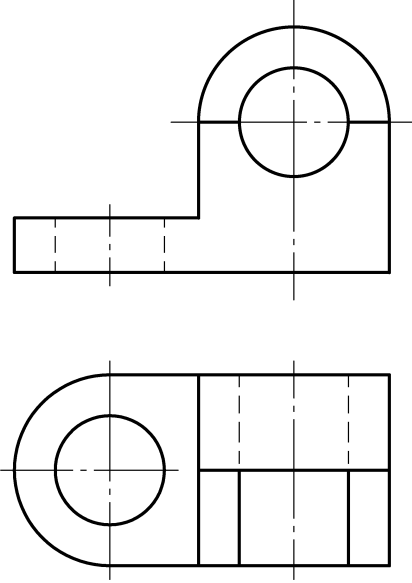
10.



11.



12.



2-5 Choices 选择 (mark “√” in the brackets)

1. Select the correct side view. 选择正确的左视图。

(1)

() () () ()

(2)

() () () ()

(3)

() () () ()

2. Select the correct top view. 选择正确的俯视图。

(1)

()

(2)

()

(3)

()

3. Select the correct two - view drawings. 选择正确的两视图。

()

()

()

()

4. Select the correct three - view drawings. 选择正确的三视图。

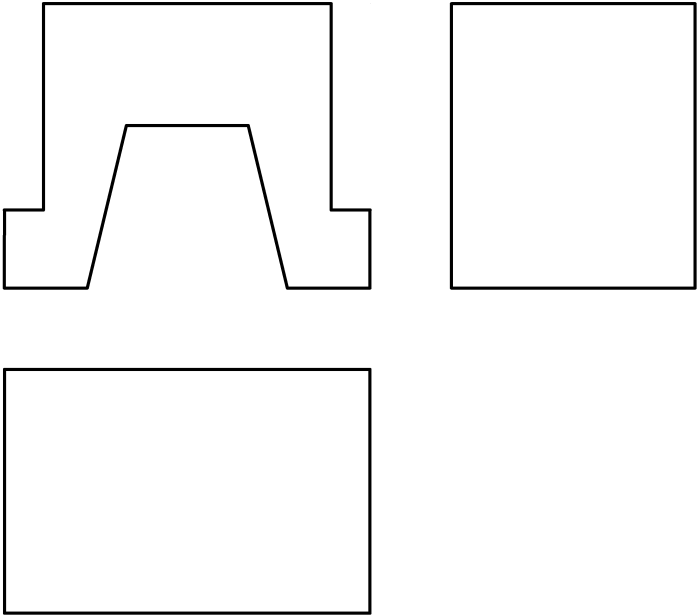
()

()

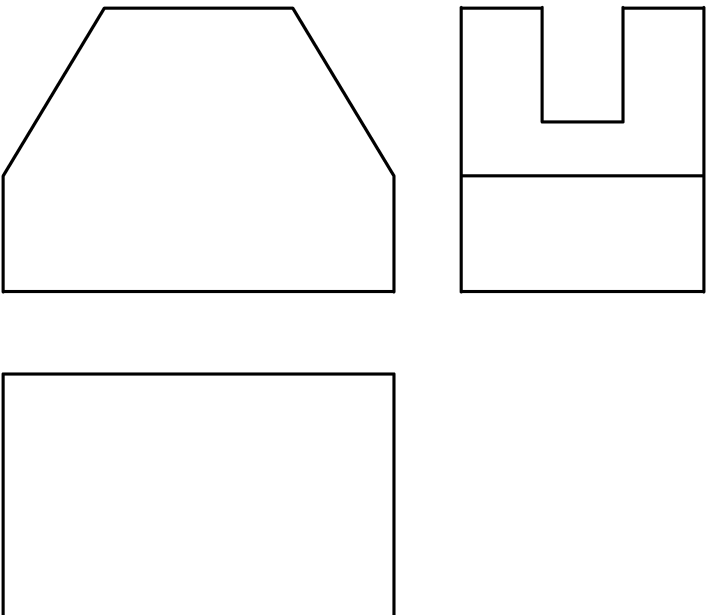
()

()

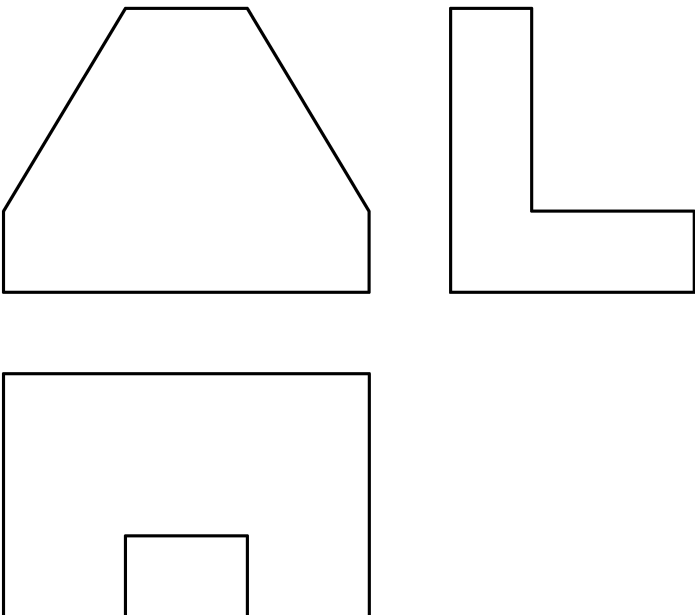
1.



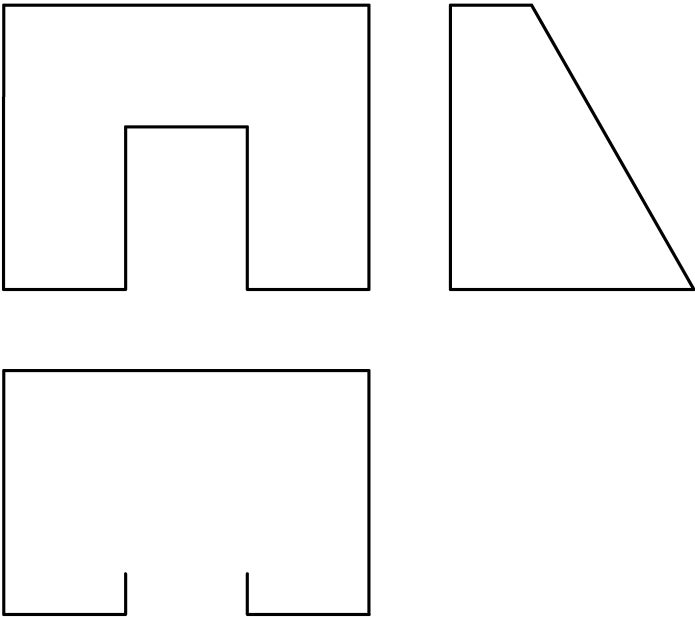
2.



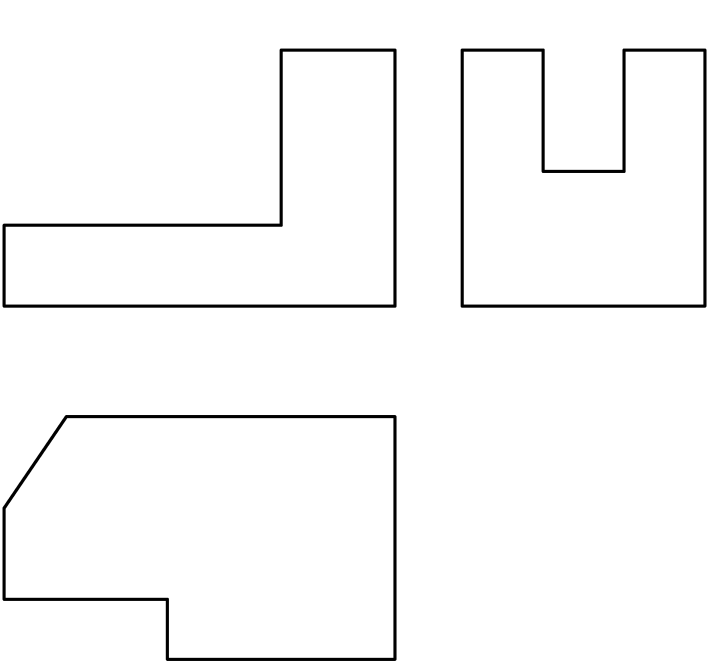
3.



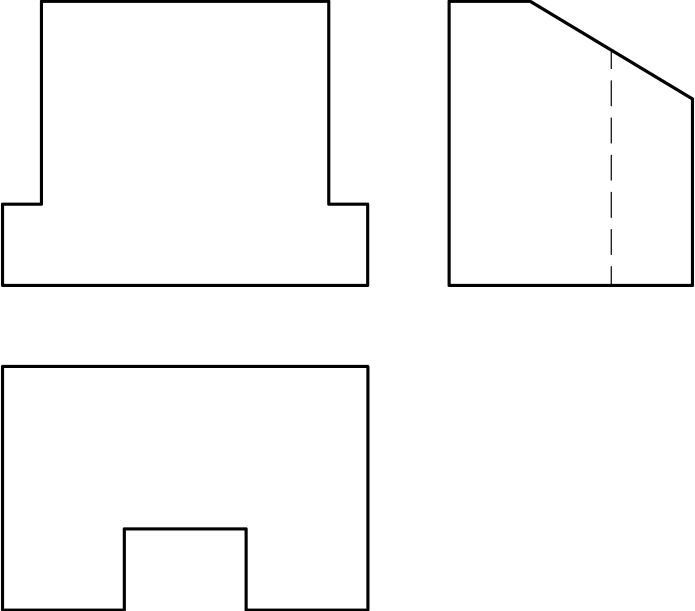
4.



5.

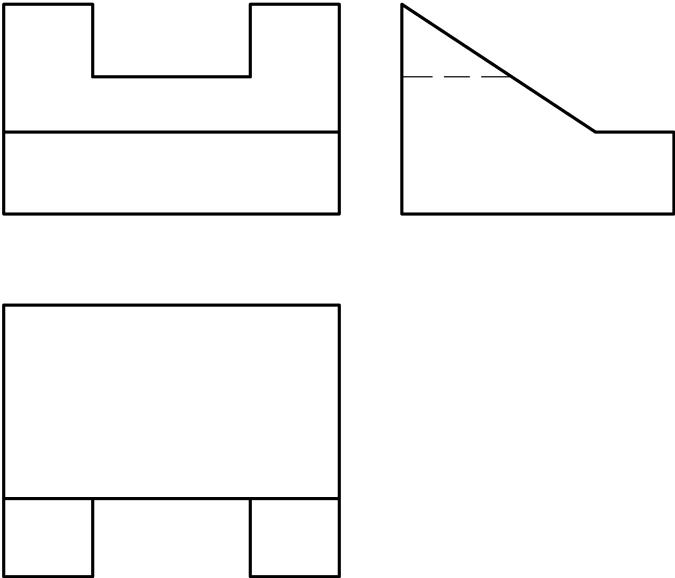


6.

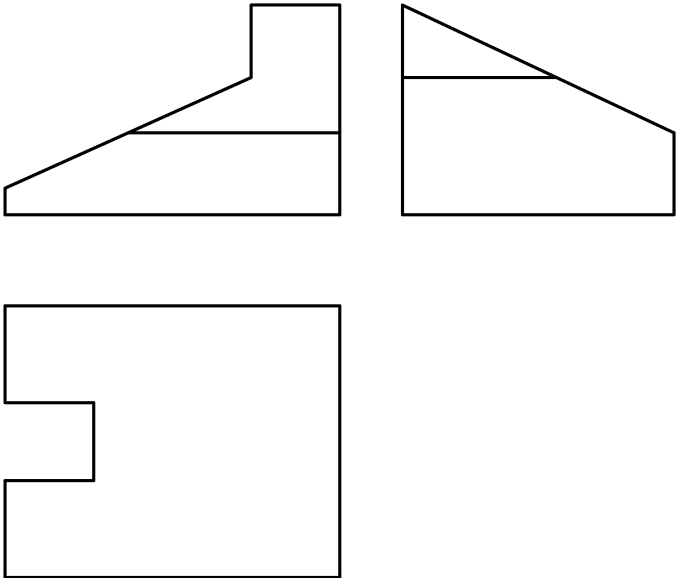


2-6 Add missing details 补画所缺图线 (续)

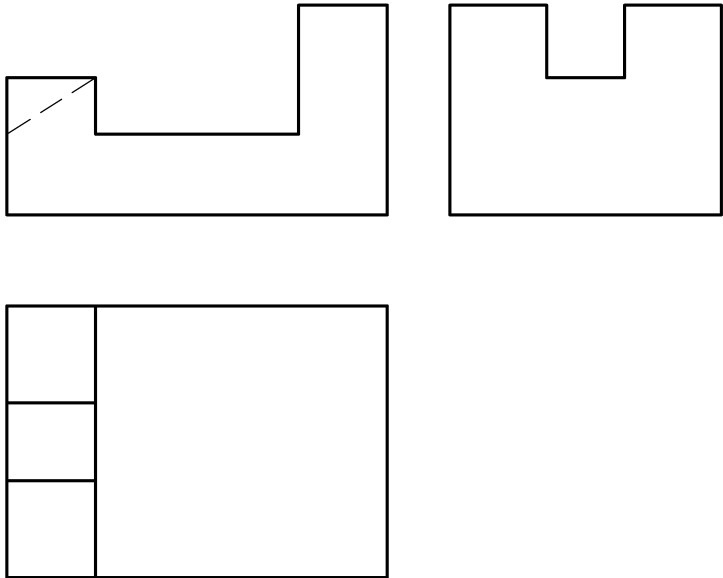
7.



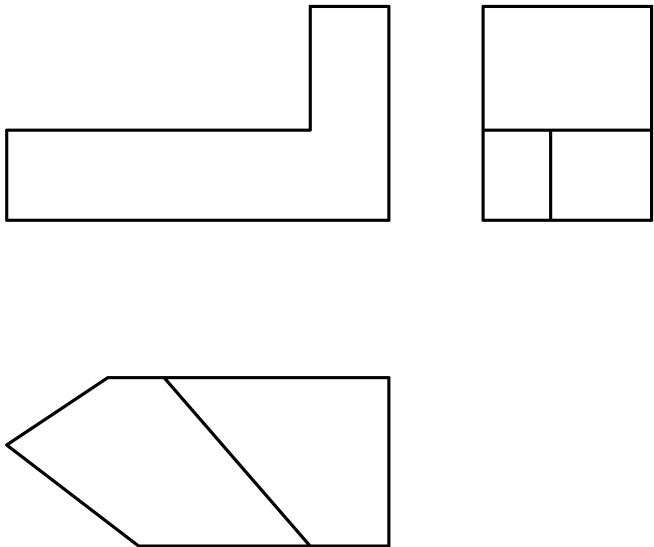
8.



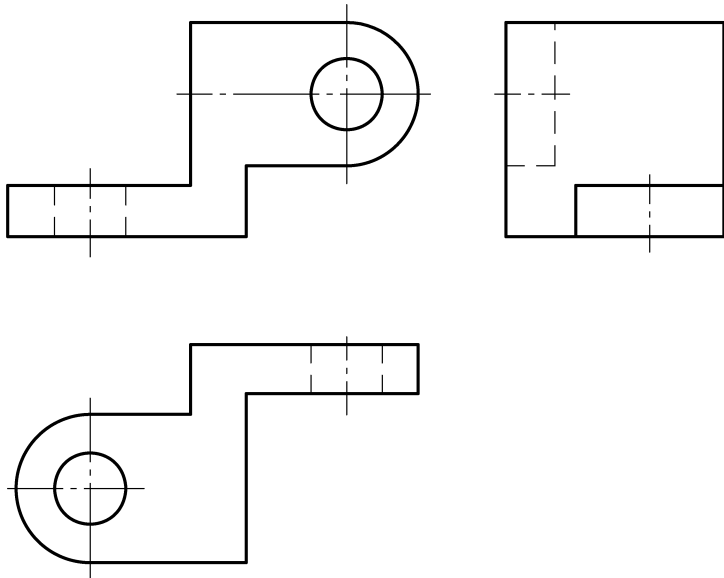
9.



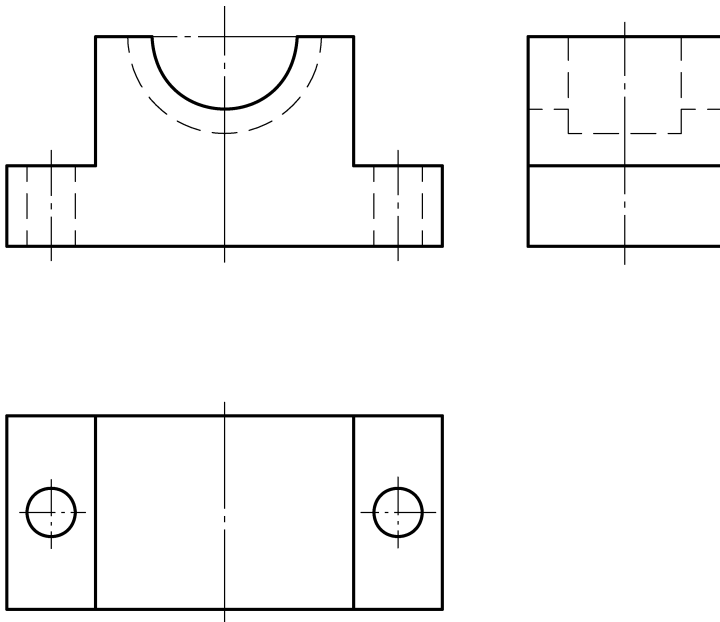
10.



11.



12.

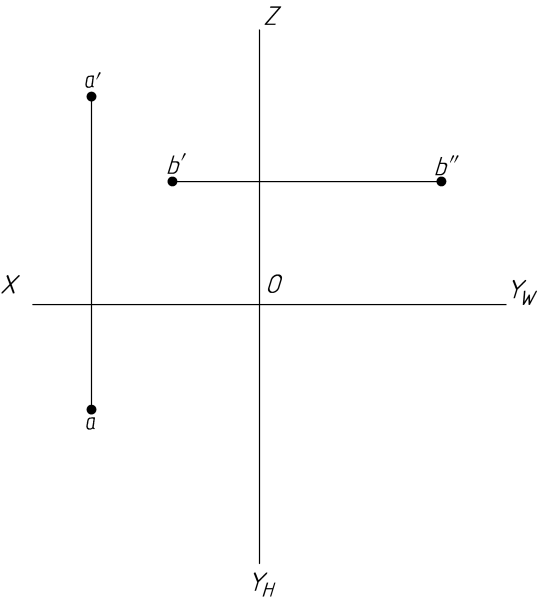


Chapter 3 Projection of Points, Lines and Planes 点、直线、平面的投影

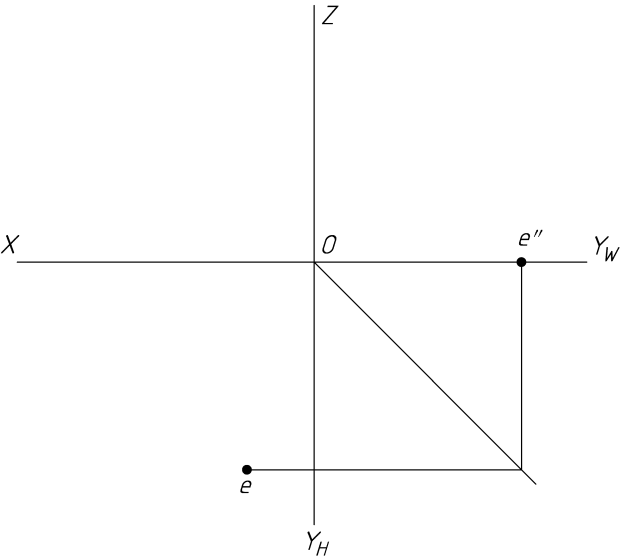
3-1 Projection of points 点的投影

14

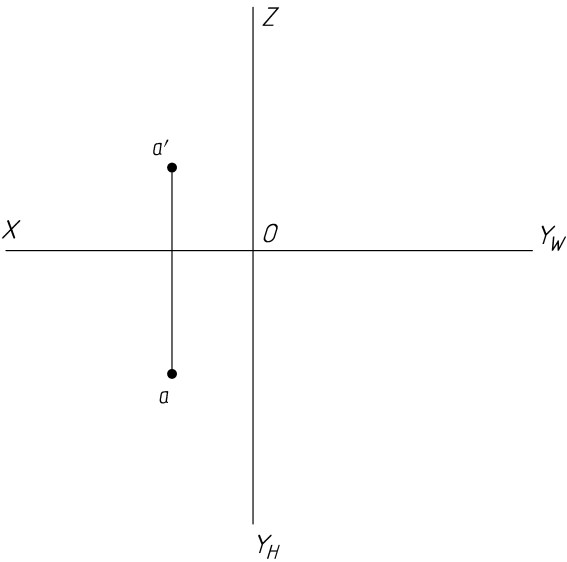
1. Draw a'' and b of the projections of Point A and B . 补画点 A 和 B 的投影。



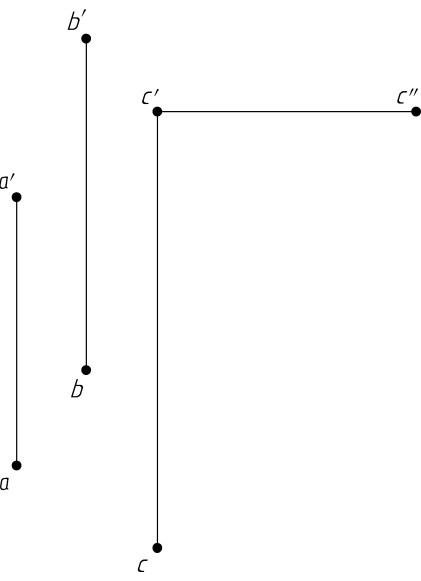
2. Draw e' and the three projections of point G given that G up E 20mm, left E 10mm, behind E 15mm. 补 e' , 求 G 点的三面投影, 点 G 在点 E 上方 20mm, 左方 10mm, 后方 15mm。



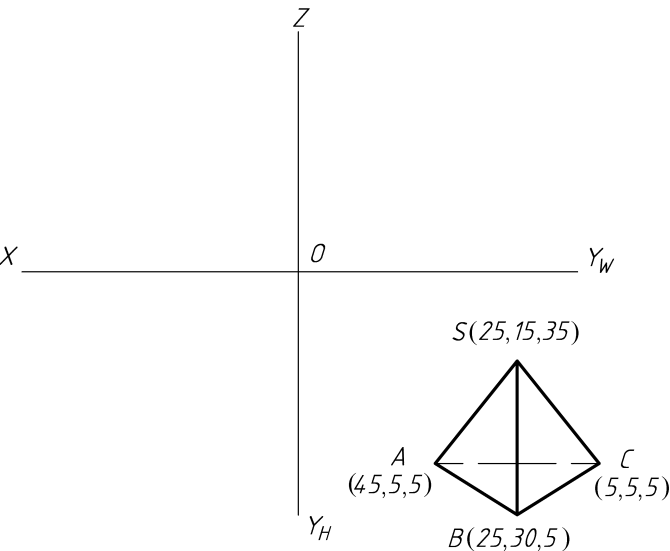
3. Draw the three projections of point B given that point A and B are equidistant from plane V and B left A 15mm, up A 10mm. 点 A 与点 B 距 V 面相等, 且点 B 在点 A 的左方 15mm, 上方 10mm, 试画点 B 的投影。



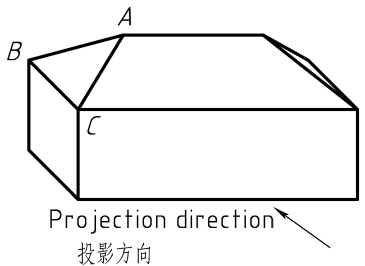
4. Complete a'' and b'' according to the relative position of two points. 利用两点间的相对位置, 画出 A 、 B 两点的侧面投影。



5. Draw three views of the triangular pyramid with the given co-ordinates values of four vertices. 已知三棱锥四个顶点的坐标值, 画出三棱锥的三视图。



6. Draw three views of the house form and mark three projections of point A , B and C , respectively. 画房屋形体三视图, 并标出 A 、 B 、 C 三点的三面投影。



Class

Stu No.

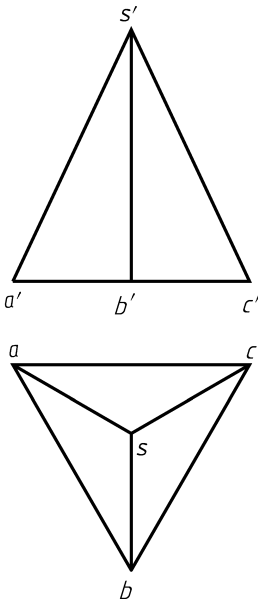
Name

Chapter 3 Projection of Points, Lines and Planes 点、直线、平面的投影

3-2 Projection of lines 直线的投影

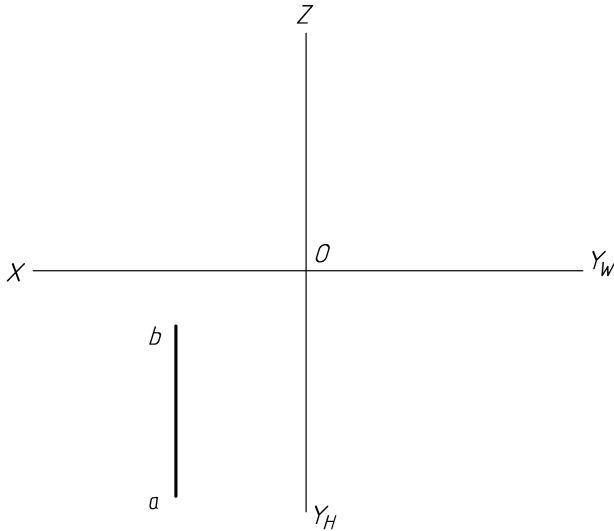
15

1. State the position of each edge to the projection plane. 判断各棱边对投影面的位置。

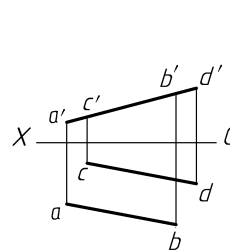


SA is a general line. 一般位置直线。
SB is _____
SC is _____
AB is _____
BC is _____
CA is _____

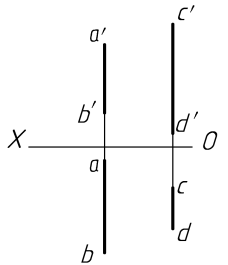
2. Draw $a'b'$ and $a''b''$ given that AB is a V -perpendicular line and equidistant from plane H and W . AB 为正垂线，与 H 及 W 面等距，画出其另两面投影。



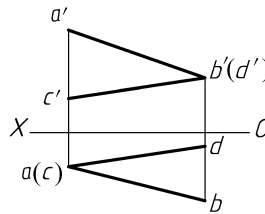
3. State the relative position of line AB and CD . 判断线 AB 、 CD 的相对位置。



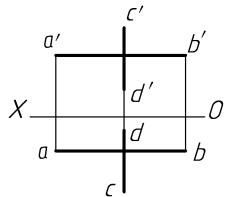
AB 、 CD _____



AB 、 CD _____

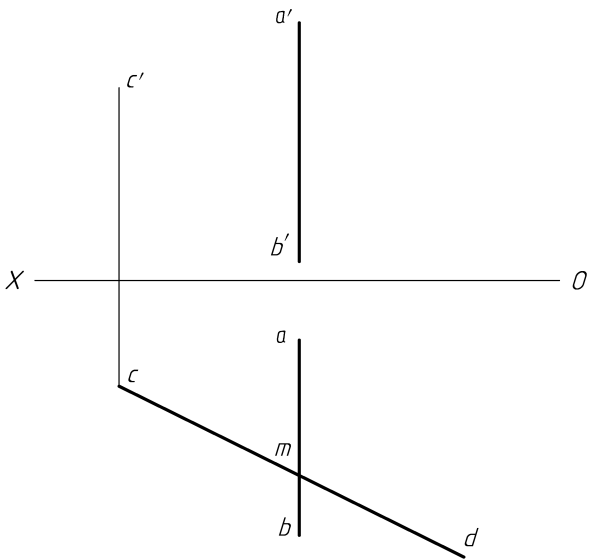


AB 、 CD _____



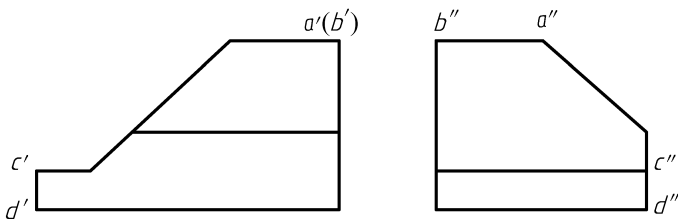
AB 、 CD _____

4. Draw m' of the intersection point and complete the projection of $c'd'$ using line into segmentation for analogy method. 用分割线段成定比法，求相交两直线的交点 m' ，补出线 $c'd'$ 投影。



5. Draw the top view, ab and cd on the top view, and answer questions. 补画俯视图，标出线 ab 和 cd ，并回答问题。

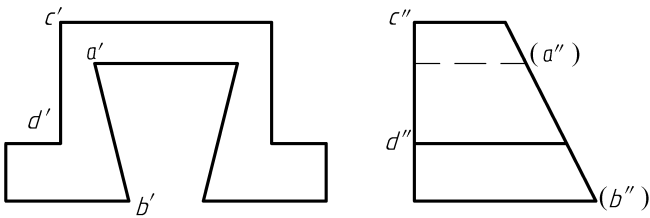
(1)



AB is _____ line.

CD is _____ line.

(2)



AB is _____ line.

CD is _____ line.

Class

Stu No.

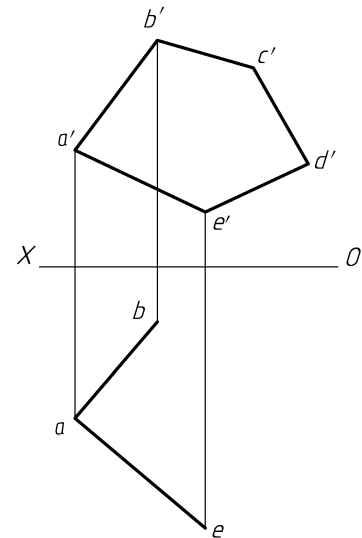
Name

Chapter 3 Projection of Points, Lines and Planes 点、直线、平面的投影

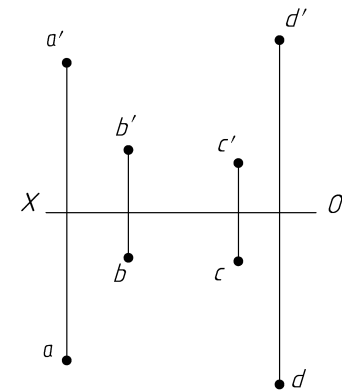
3-3 Projection of planes 平面的投影

16

1. Complete the horizontal projection of plane $ABCDE$. 完成 $ABCDE$ 平面的水平投影。

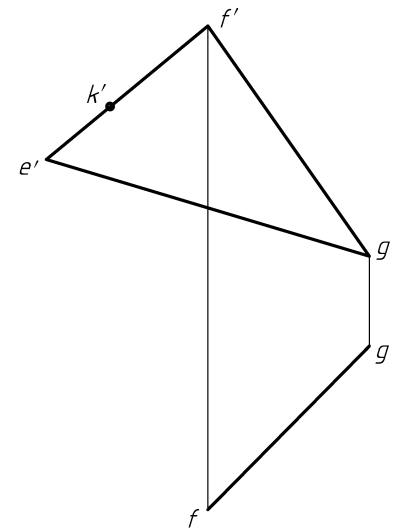


2. Determine whether points A , B , C and D are in the same plane. 判断 A 、 B 、 C 和 D 四点是否在同一平面内。

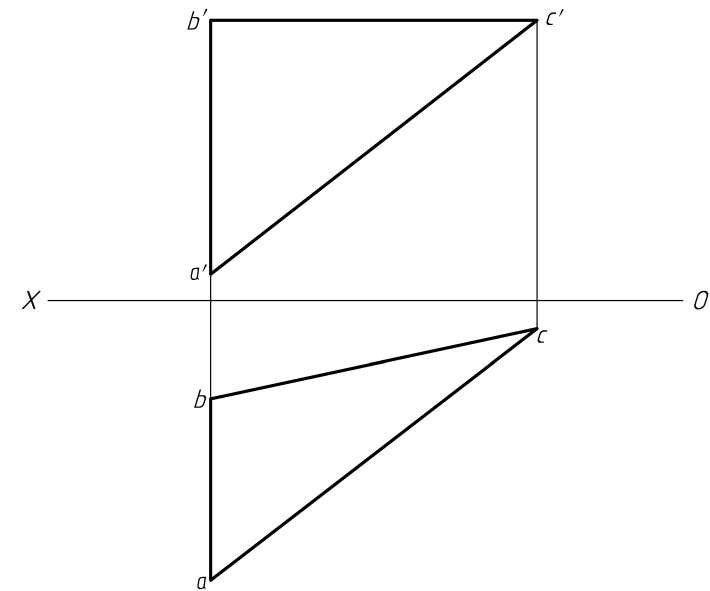


Points A, B, C, D _____ (are or aren't) in the same plane. (在/不在)

3. Complete the horizontal projection of the plane given that GK is a frontal line in the plane EFG . 直线 GK 是三角形 EFG 平面内的一条正平线，补出平面的水平投影。

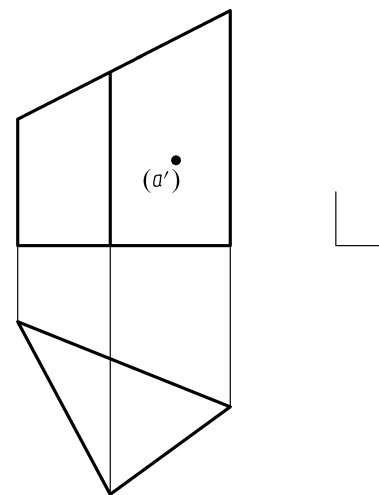


4. Draw a horizontal line in the plane ABC and the distance to the horizontal plane is 20mm. 在三角形 ABC 上作一水平线，至水平面的距离为 20mm。

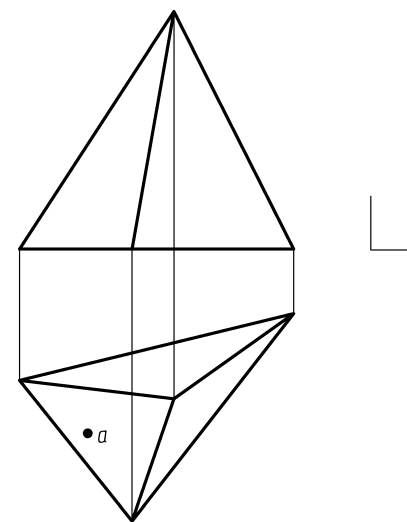


5. Draw the side view and complete the missing projections of point A on the surface of the solid. 补出左视图及立体表面点 A 所缺投影。

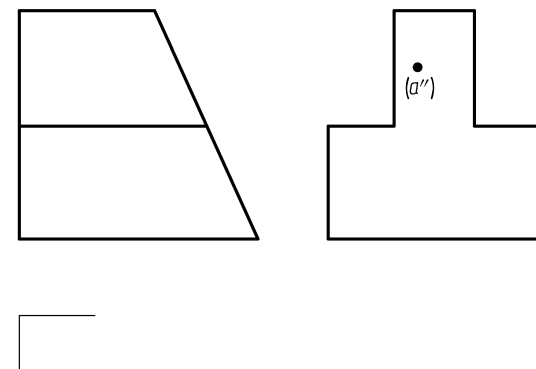
(1)



(2)



(3)



Class

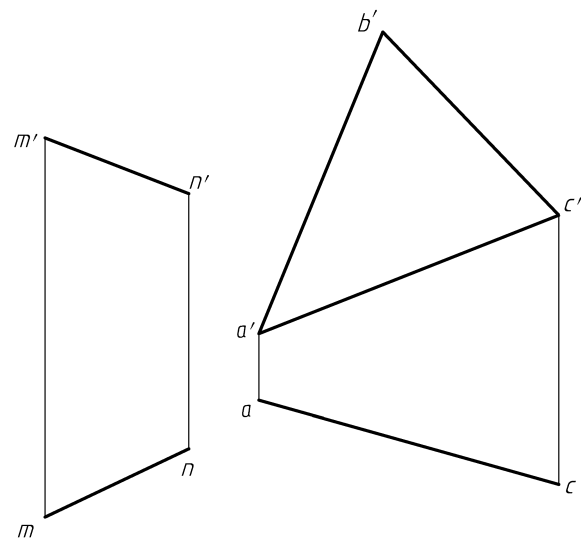
Stu No.

Name

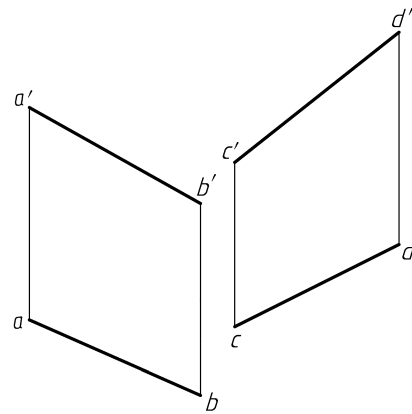
Chapter 3 Projection of Points, Lines and Planes 点、直线、平面的投影

3-4 Relative position of lines and planes 线面的相对位置

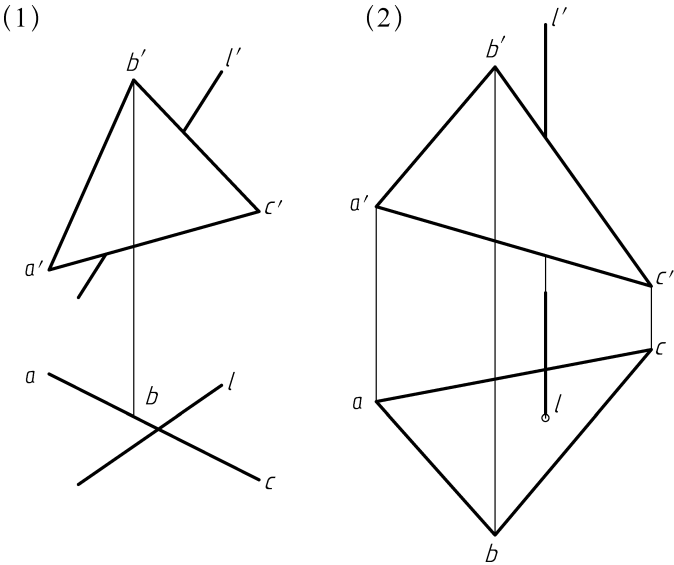
1. Complete the horizontal projection of triangle ABC given that line MN is parallel with triangle ABC . 直线 MN 与三角形 ABC 平行, 补全三角形的 H 面投影。



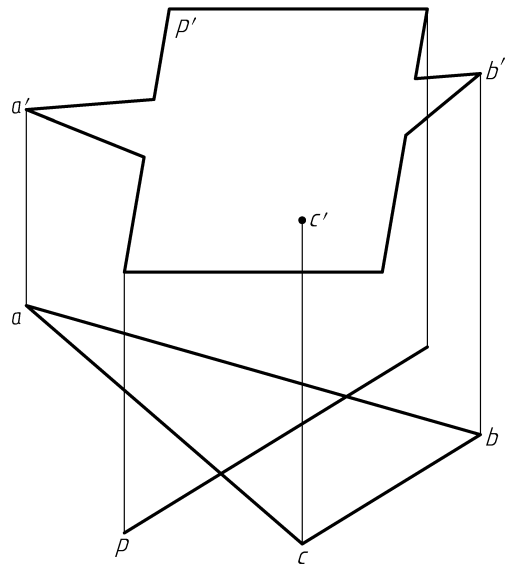
2. Draw two parallel planes, including the given intersection lines AB and CD , respectively. 过交叉两直线 AB 与 CD 分别作一平面, 使其互相平行。



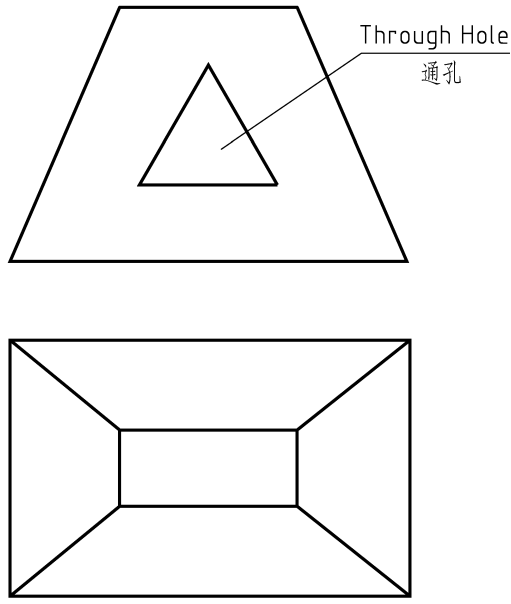
3. Draw the intersection point of line L and plane ABC and identify its visibility. 求直线 L 与平面 ABC 的交点, 并判断直线的可见性。



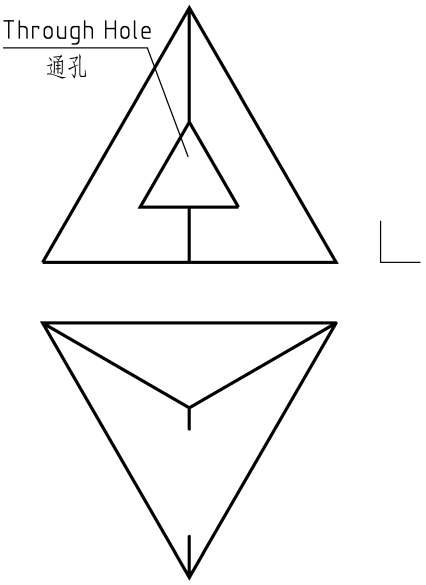
4. Draw the intersection line of plane P and plane ABC and identify its visibility. 求平面 P 与平面 ABC 的交线, 并判别可见性。



5. Complete the top view of the object. 补全物体的俯视图。



6. Complete the top view and draw the side view of the object. 补全物体的俯视图, 补画左视图。

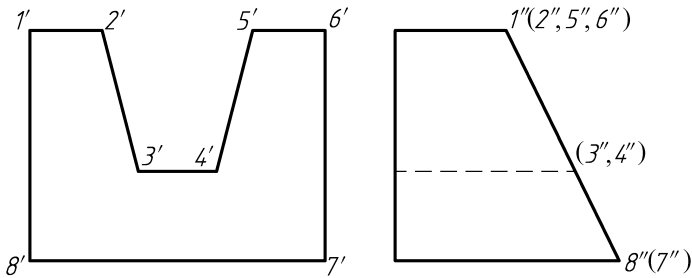


Chapter 3 Projection of Points, Lines and Planes 点、直线、平面的投影

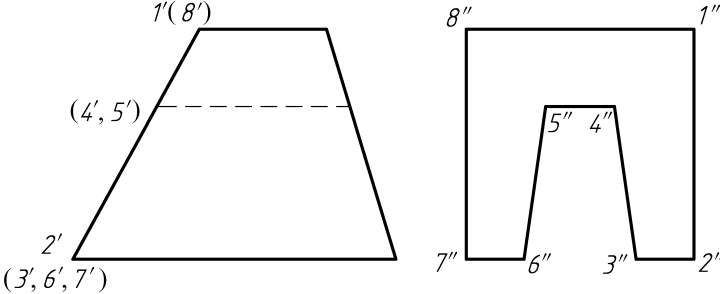
3-5 Draw the third view using line & plane analysis method 线面分析法补画第三视图

18

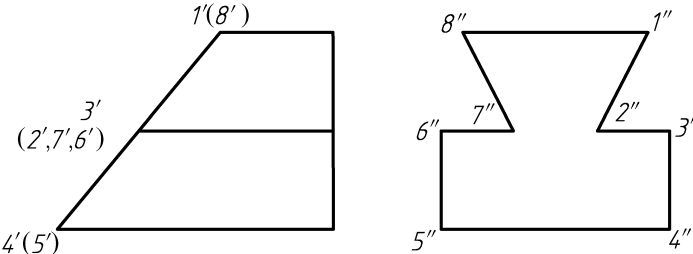
1. Draw the top view. 补画俯视图。



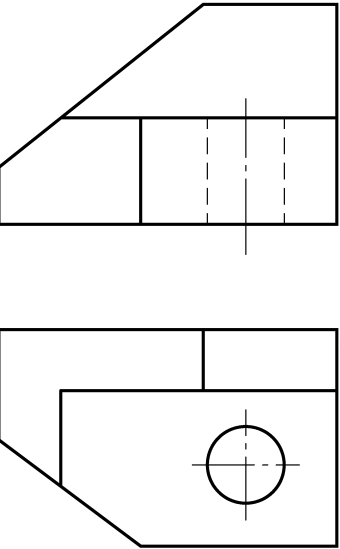
2. Draw the top view. 补画俯视图。



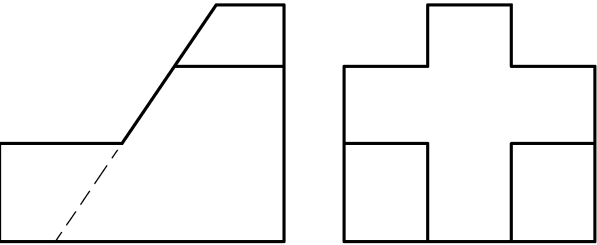
3. Draw the top view. 补画俯视图。



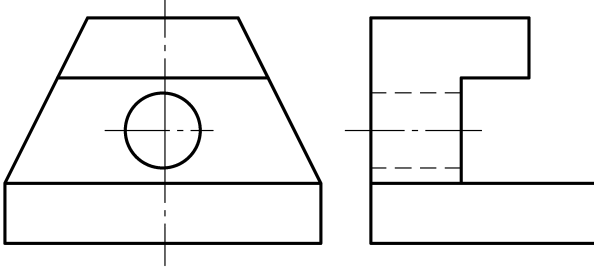
4. Draw the side view. 补画左视图。



5. Draw the top view. 补画俯视图。



6. Draw the top view. 补画俯视图。



Class

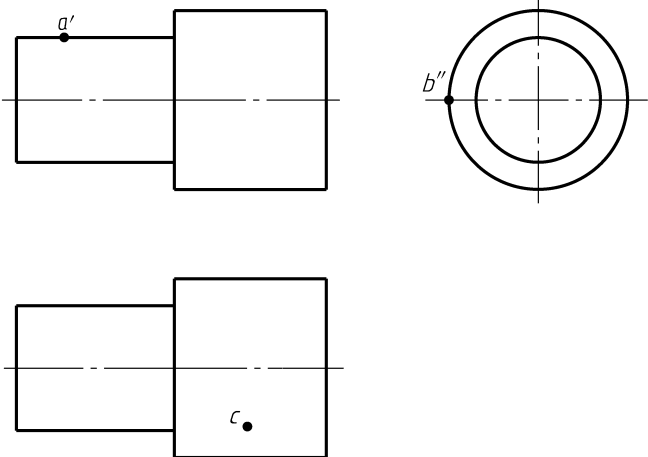
Stu No.

Name

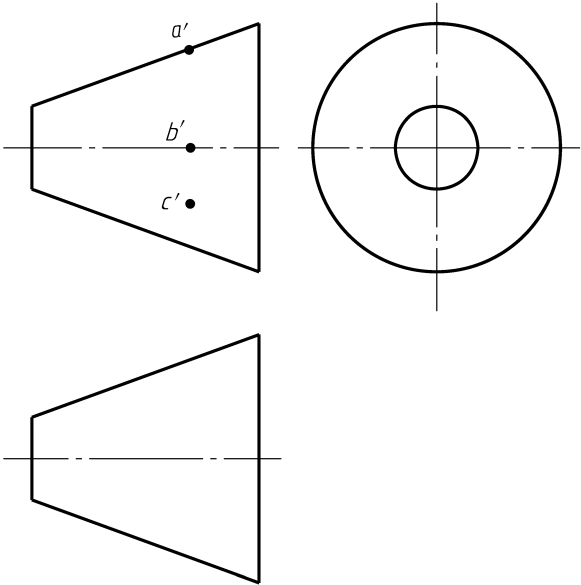
4-1 Curved solids 曲面立体

1. Complete the missing projections of given point on curved solids surfaces. 补出曲面立体上各点所缺投影。

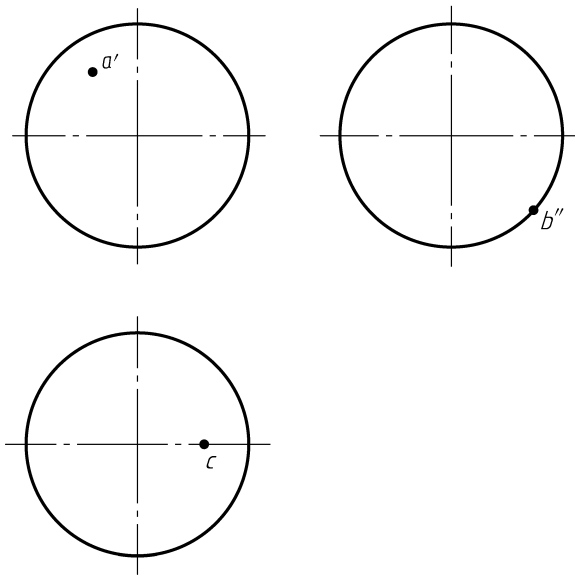
(1)



(2)

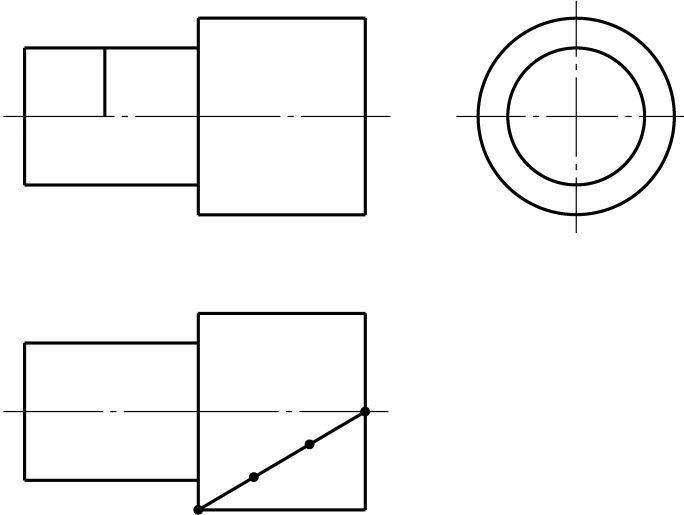


(3)

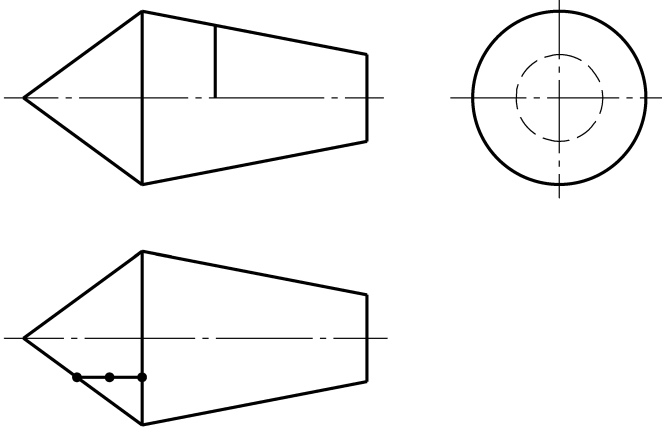


2. Complete the missing projections of given lines and points on curved solids surfaces. 补出曲面立体上各条线所缺的投影。

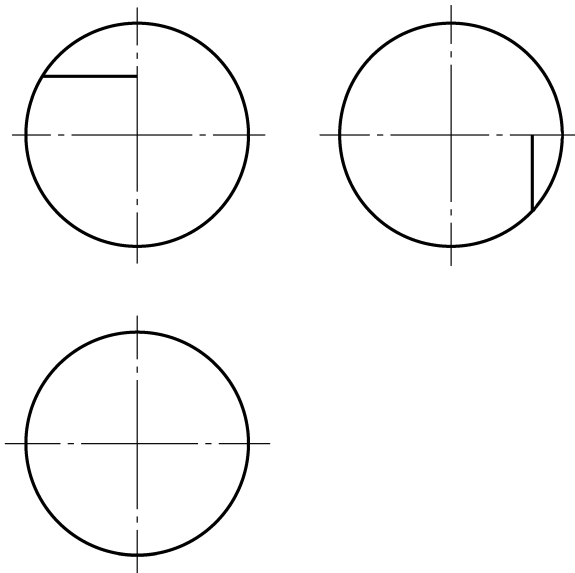
(1)



(2)

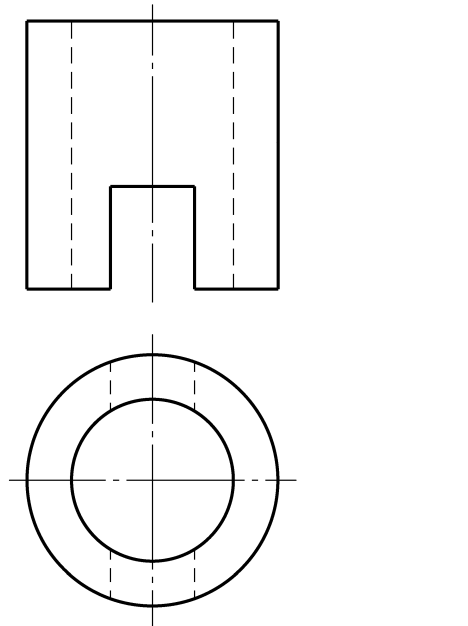


(3)

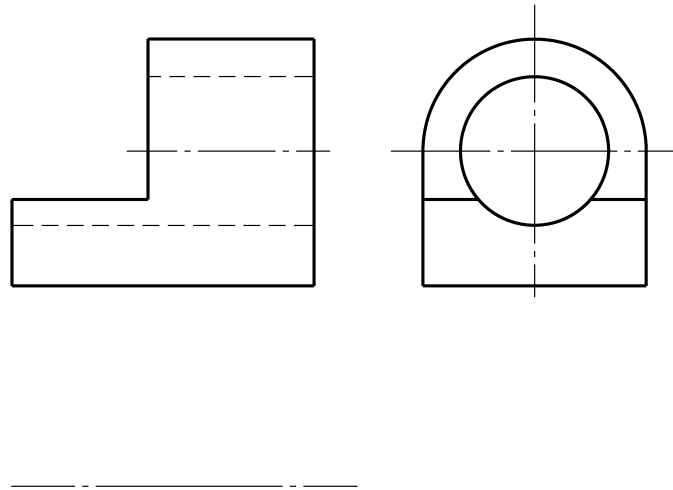


4-2 Intersection of planes and solids 平面与立体相交

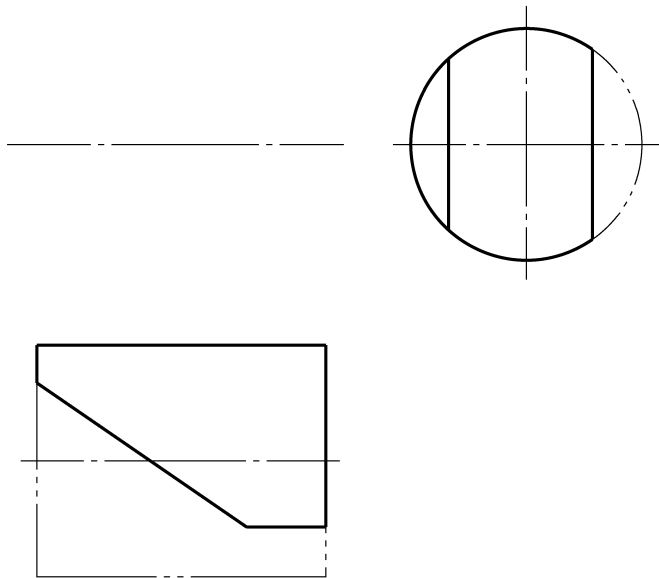
1. Draw the side view. 补画左视图。



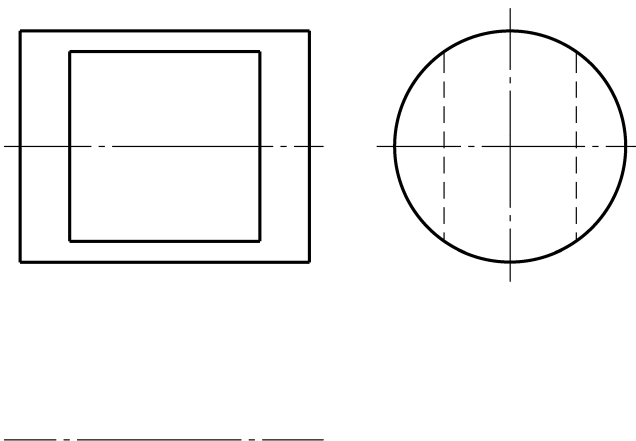
2. Draw the top view. 补画俯视图。



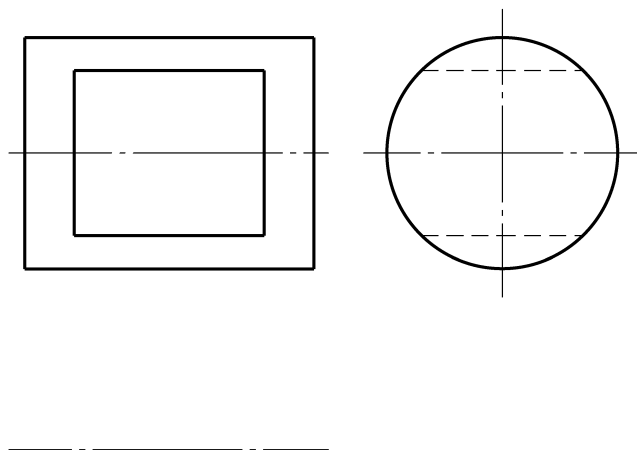
3. Draw the front view. 补画主视图。



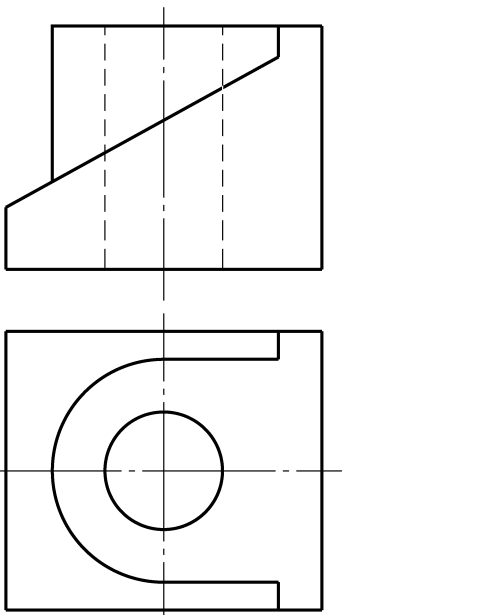
4. Draw the top view. 补画俯视图。



5. Draw the top view. 补画俯视图。

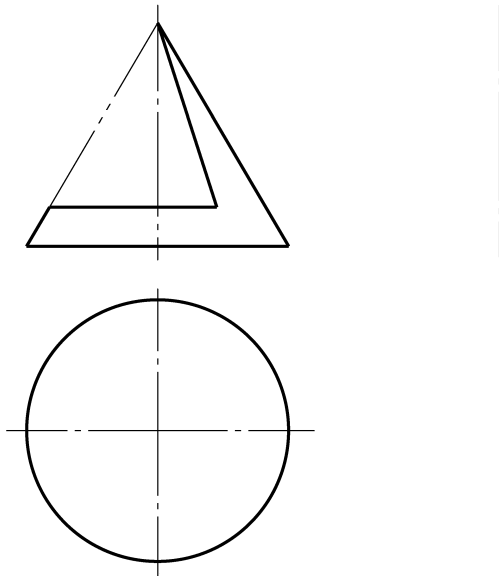


6. Draw the side view. 补画左视图。

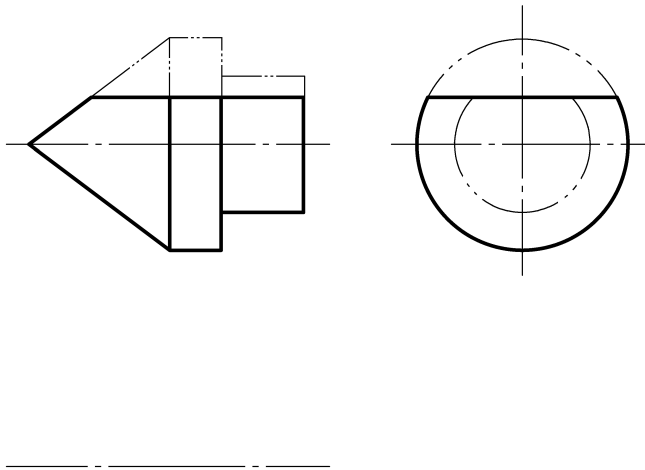


4-2 Intersection of planes and solids 平面与立体相交（续）

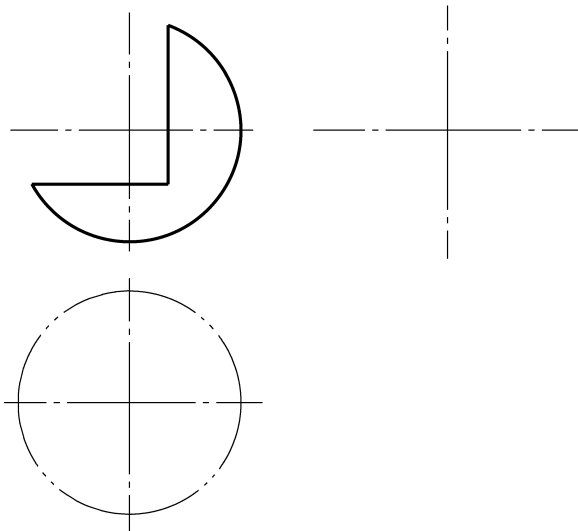
7. Draw the side view and complete the top view. 补画左视图，补全俯视图。



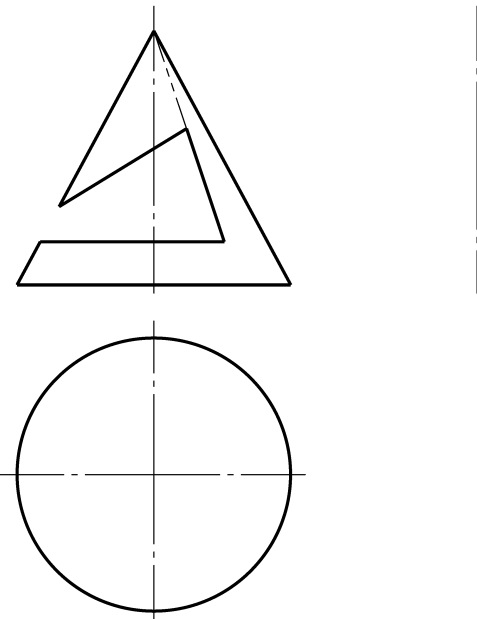
8. Draw the top view. 补画俯视图。



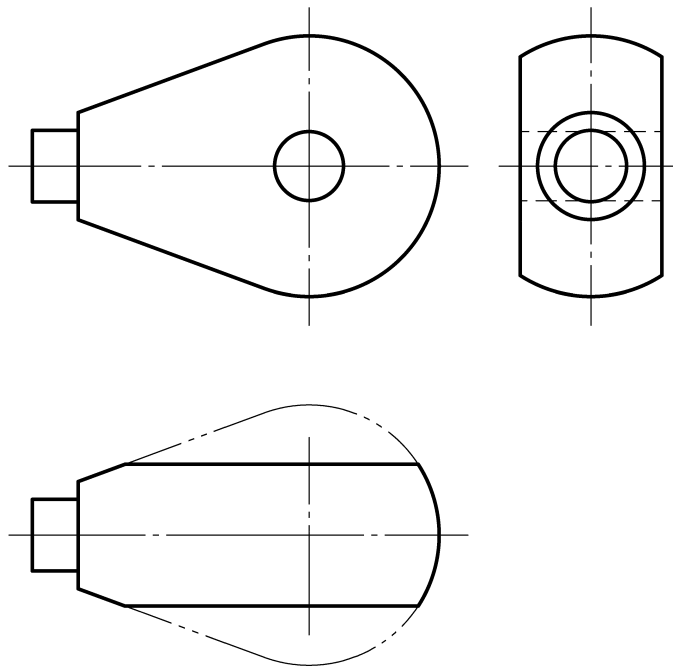
9. Draw the top view and the side view. 补画俯视图和左视图。



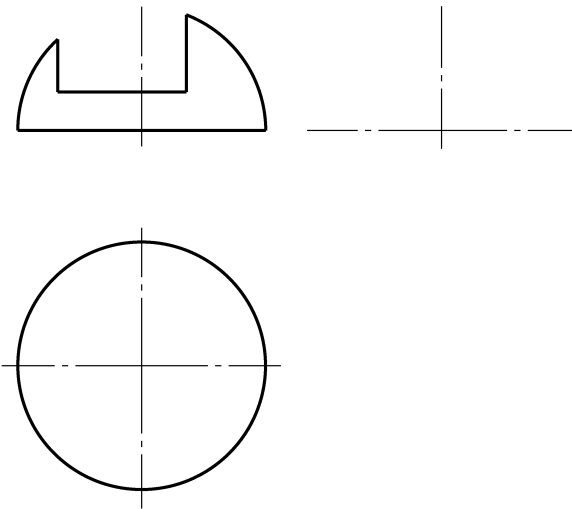
10. Draw the side view and complete the top view. 补画左视图，补全俯视图。



11. Complete the front view and the top view. 补全主视图、俯视图。

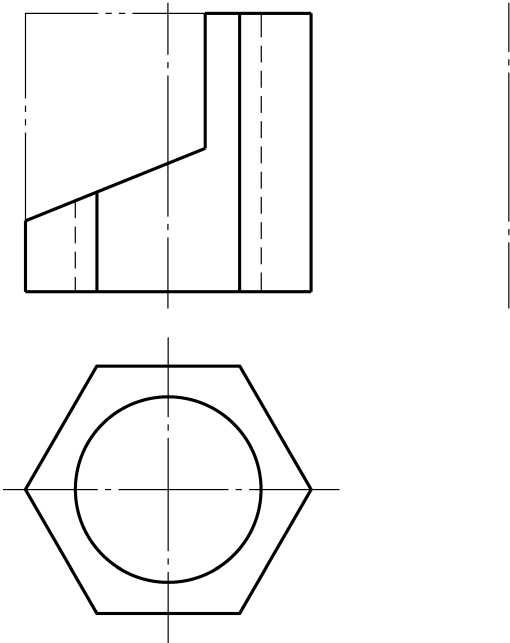


12. Draw the side view and complete the top view. 补画左视图，补全俯视图。

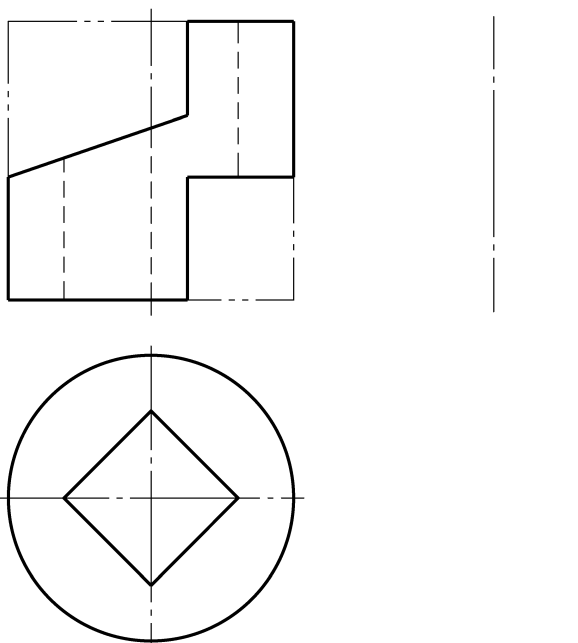


4-2 Intersection of planes and solids 平面与立体相交 (续)

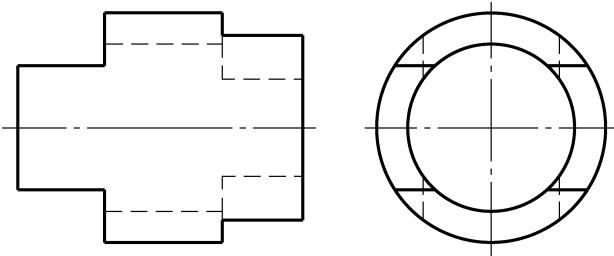
13. Draw the side view and complete the top view. 补画左视图，补全俯视图。



14. Draw the side view and complete the top view. 补画左视图，补全俯视图。

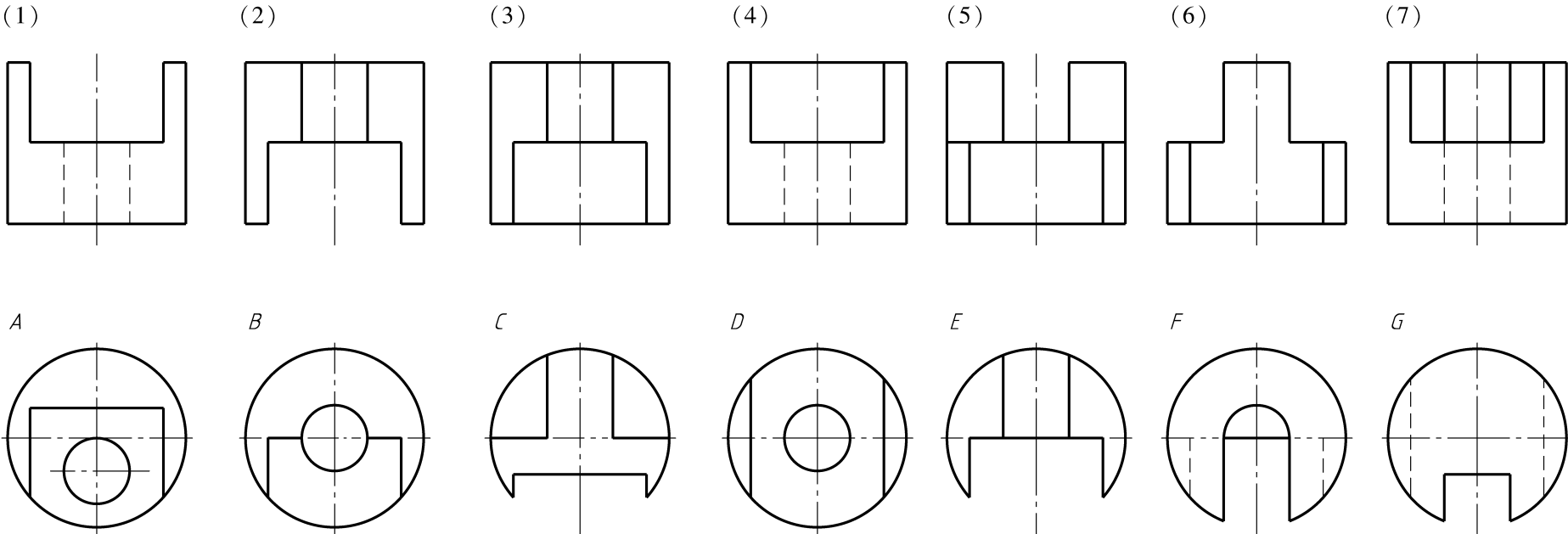


15. Draw the top view. 补画俯视图。



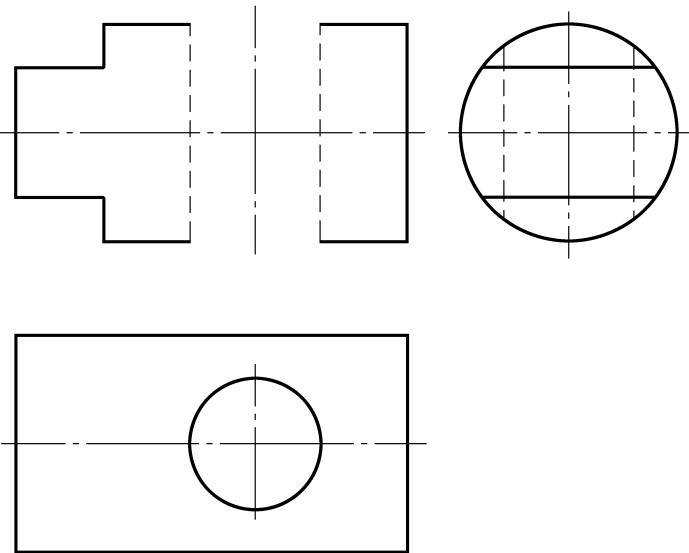
16. Select the corresponding front views and top views and fill the serial number in table. 选出对应的一组主、俯视图，并把序号填入表中。

The serial number of the front view 主视图序号	No. of the top view 俯视图序号
(1)	
(2)	
(3)	
(4)	
(5)	
(6)	
(7)	

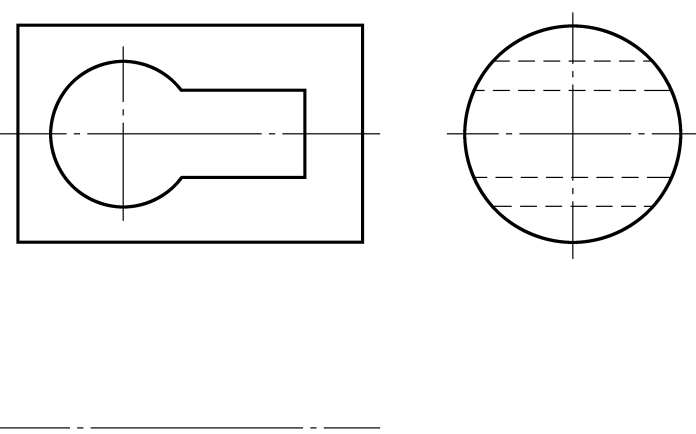


4-3 Intersection of two solids 两立体相交

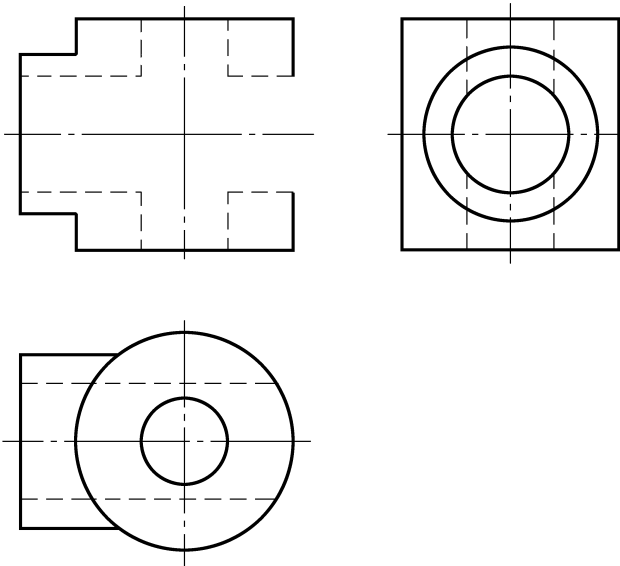
1. Complete the front view and the top view. 补全主视图和俯视图。



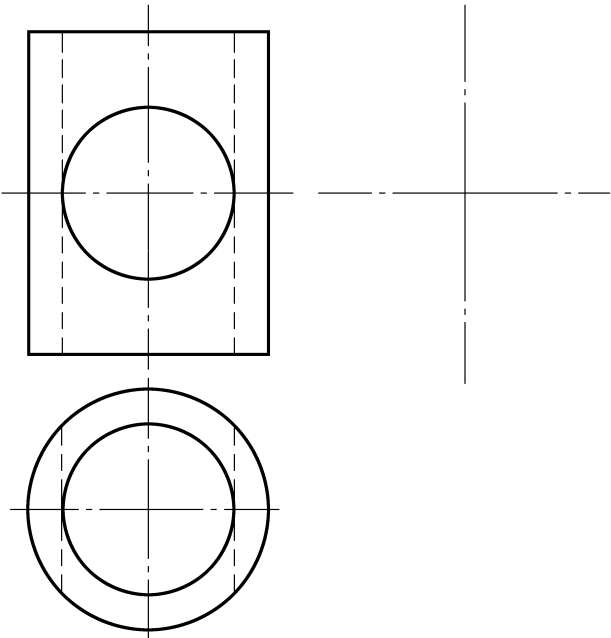
2. Draw the top view. 补画俯视图。



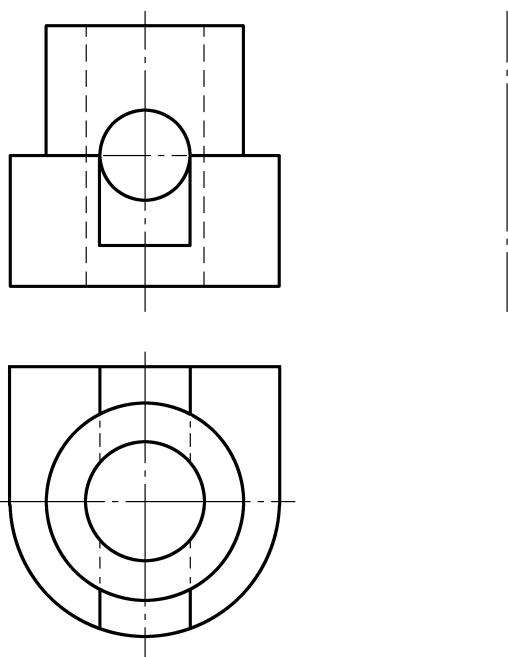
3. Complete the front view. 补全主视图。



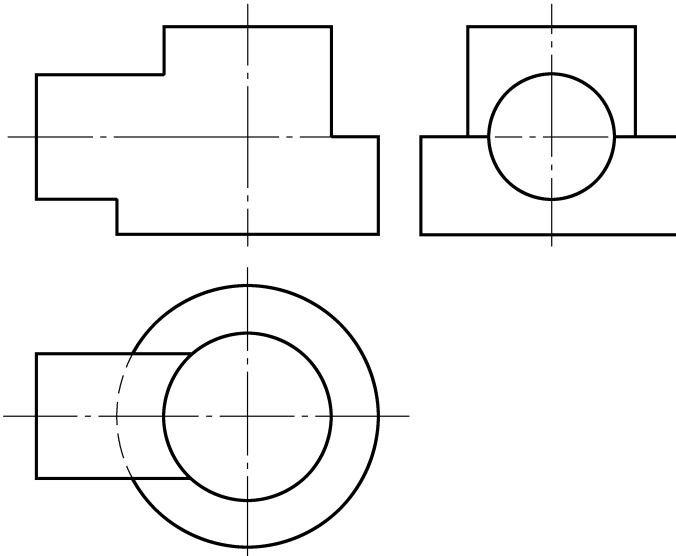
4. Draw the side view. 补画左视图。



5. Draw the side view. 补画左视图。

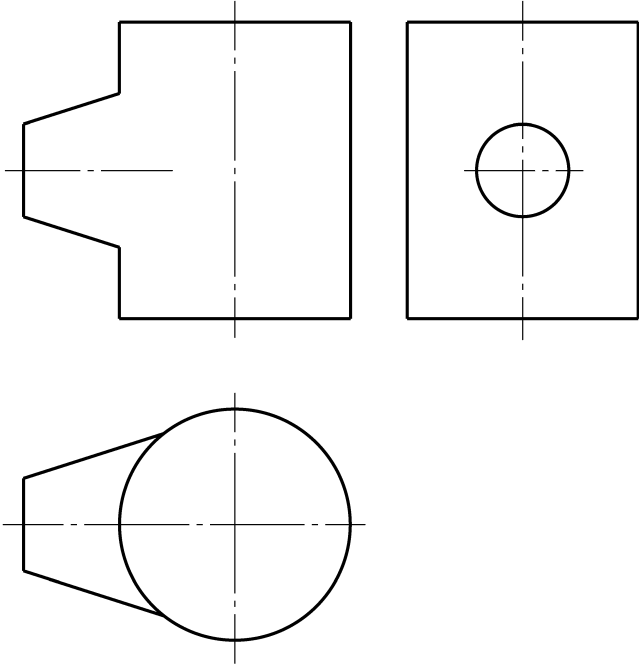


6. Complete the front view. 补全主视图。

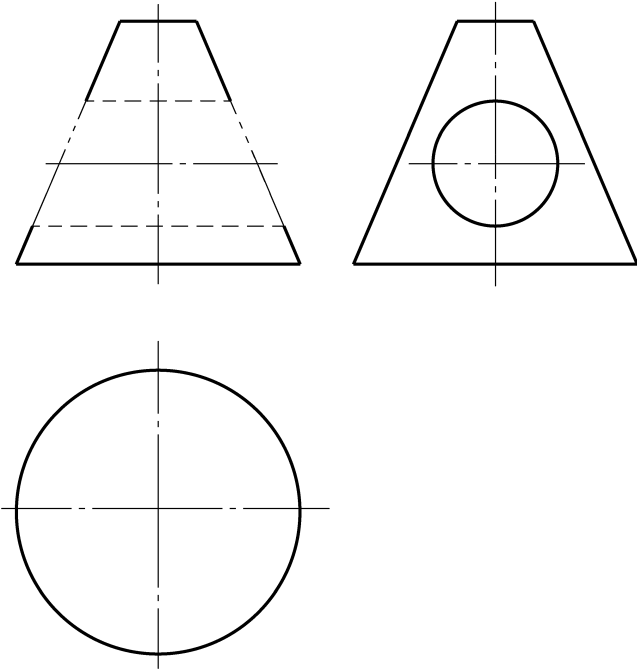


4-3 Intersection of two solids 两立体相交 (续)

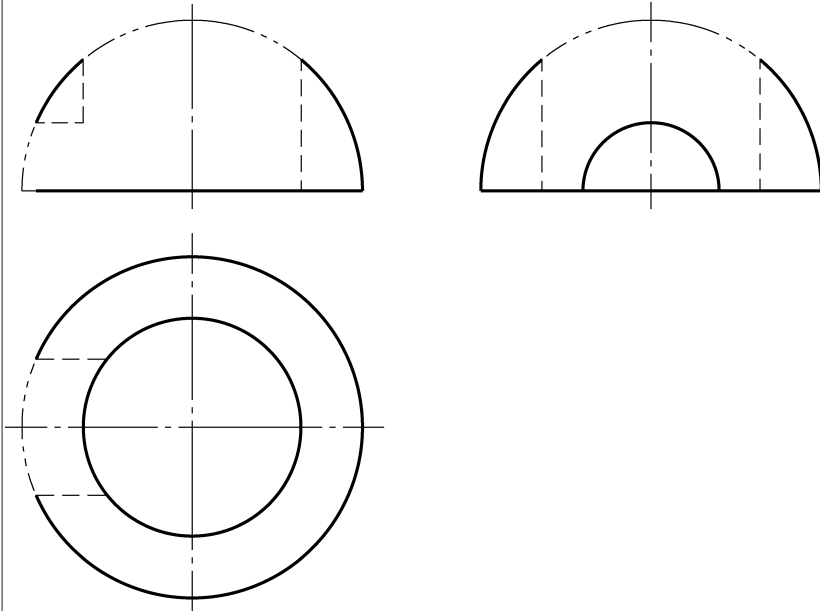
7. Complete the front view and the side view. 补全主视图和左视图。



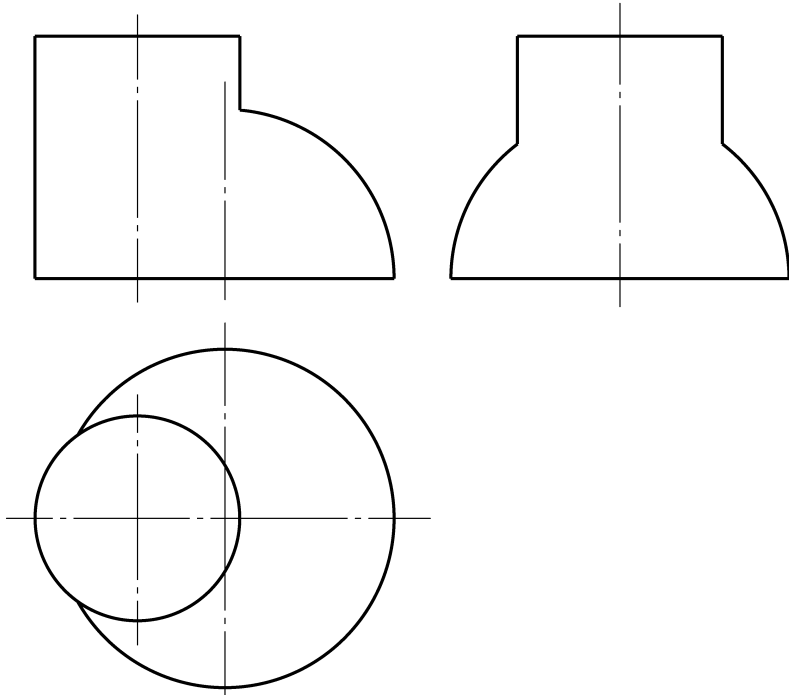
8. Complete the front view and the top view. 补全主视图和俯视图。



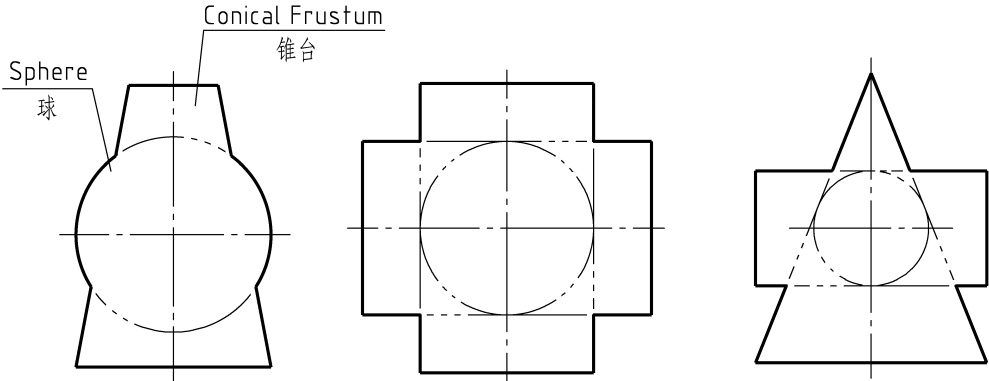
9. Complete the intersection line projections of hemisphere and cylindrical hole. 补全半球与圆孔的相贯线的所缺投影。



10. Complete the front view and the side view. 补全主视图和左视图。



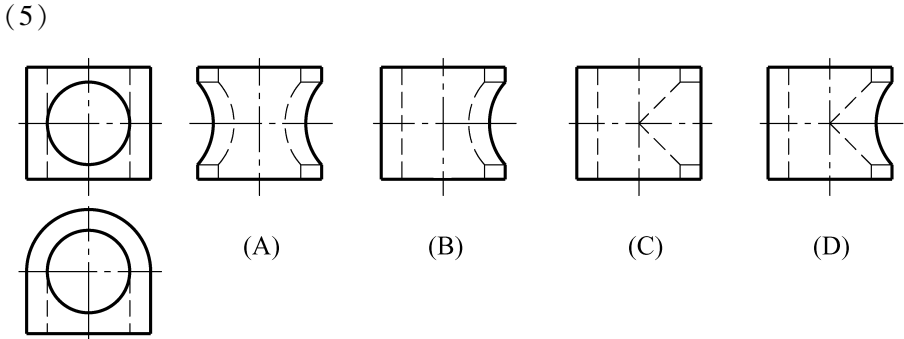
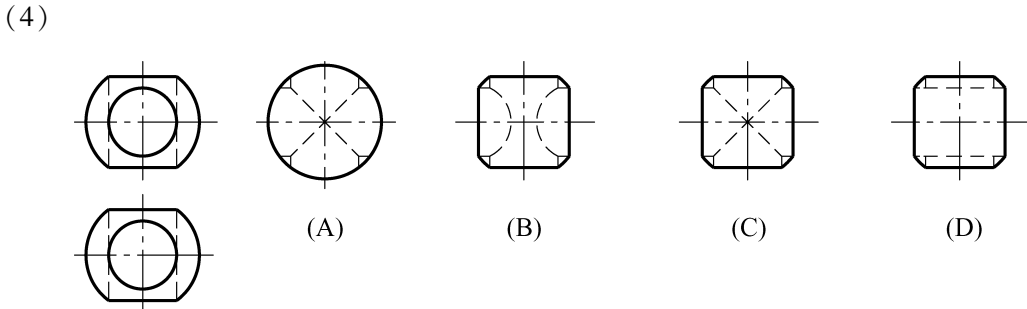
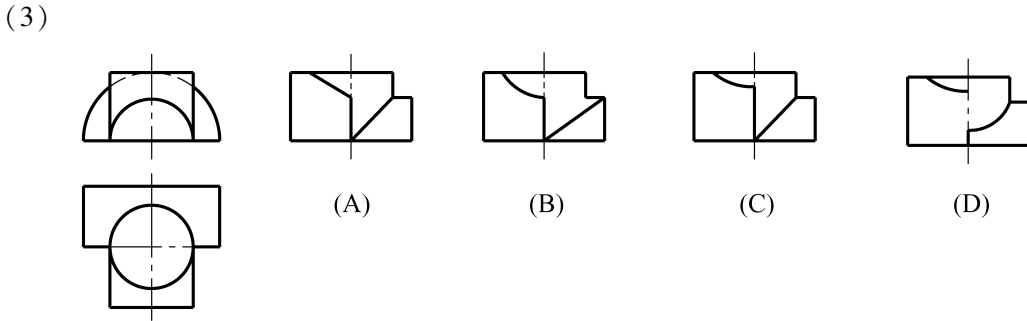
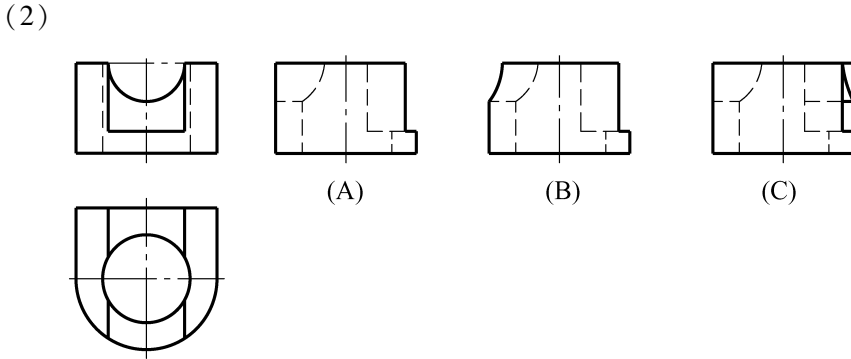
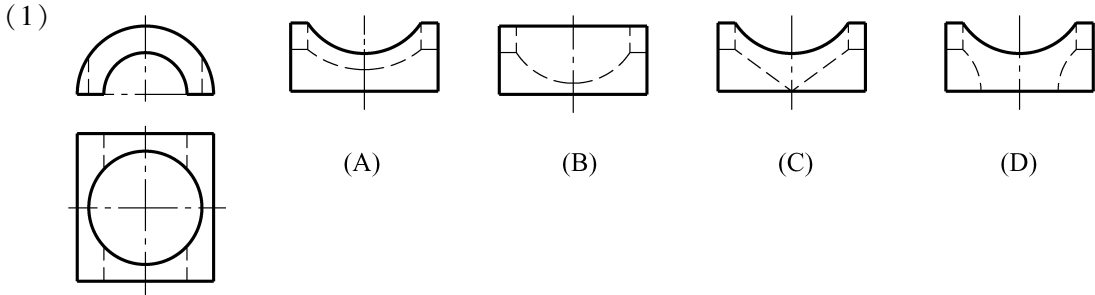
11. Draw the projection of intersection lines. 补全相贯线。



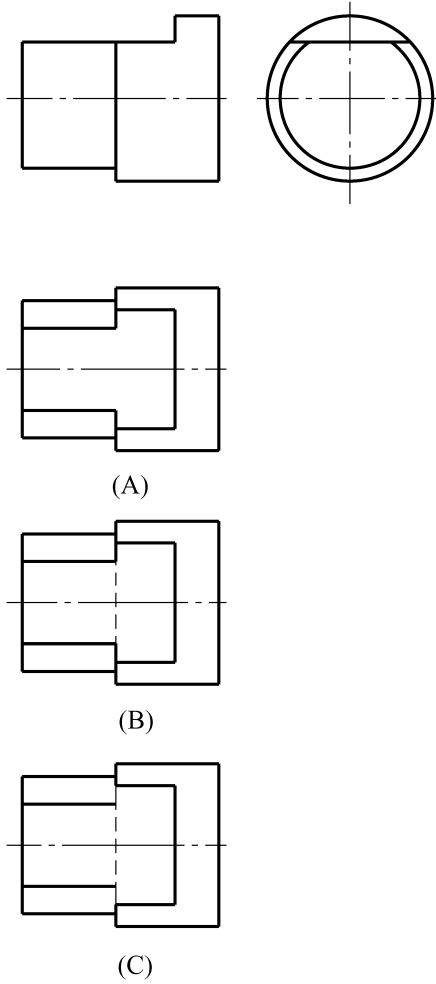
Chapter 4 Projection of Solids 立体的投影

4-4 Comprehensive exercises 综合练习 (mark “√” in the brackets)

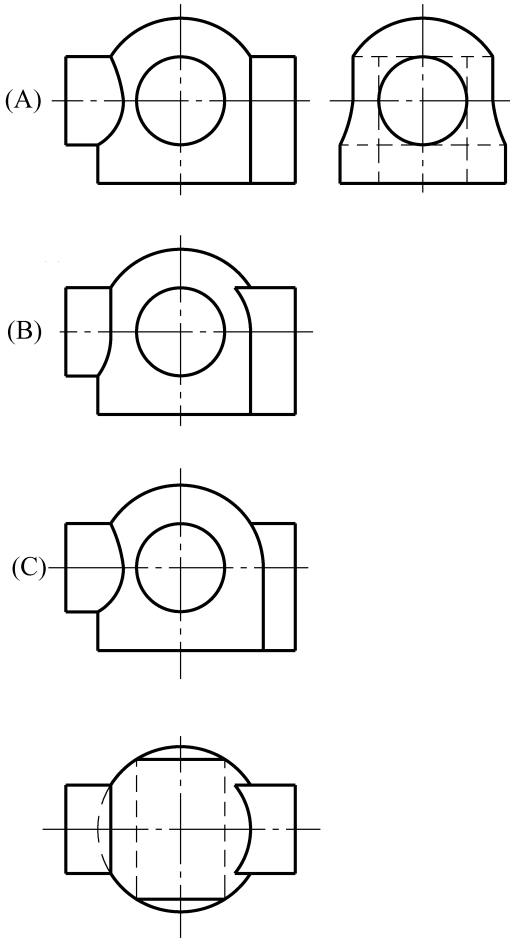
1. Select the correct side view. 选择正确的左视图。()



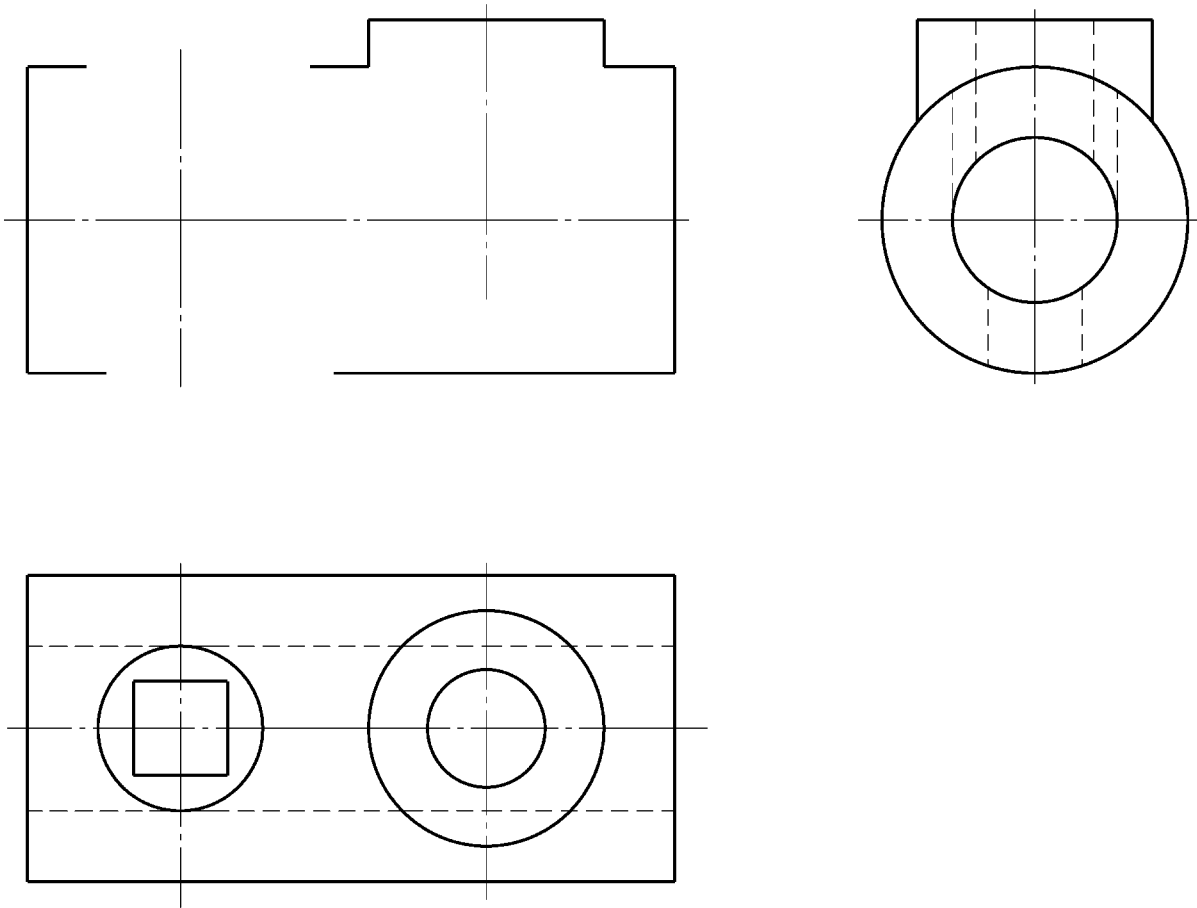
2. Select the correct top view. 选择正确的俯视图。()



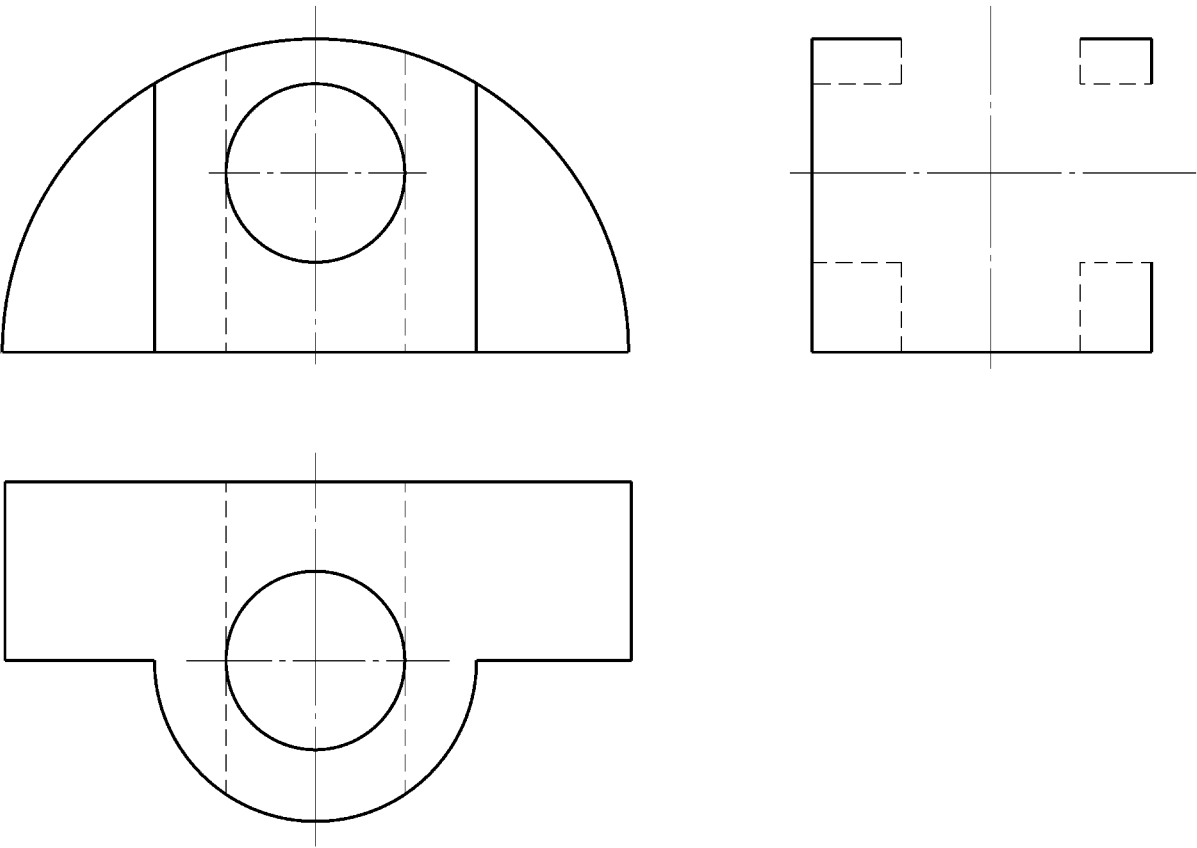
3. Select the correct front view. 选择正确的主视图。()



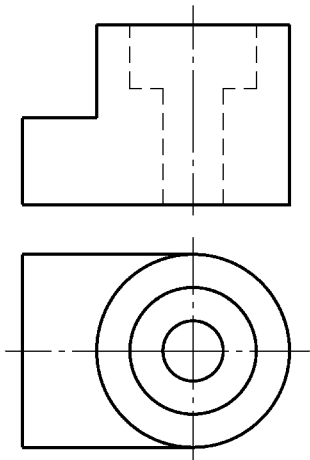
4. Complete the front view. 补全主视图。



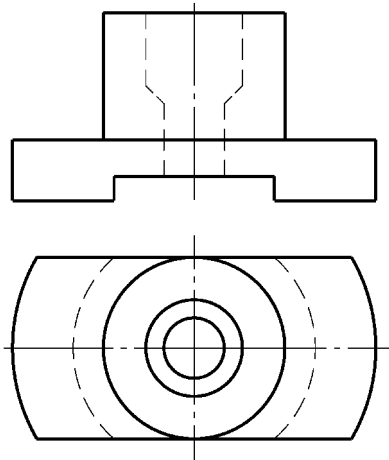
5. Complete the side view. 补全左视图。



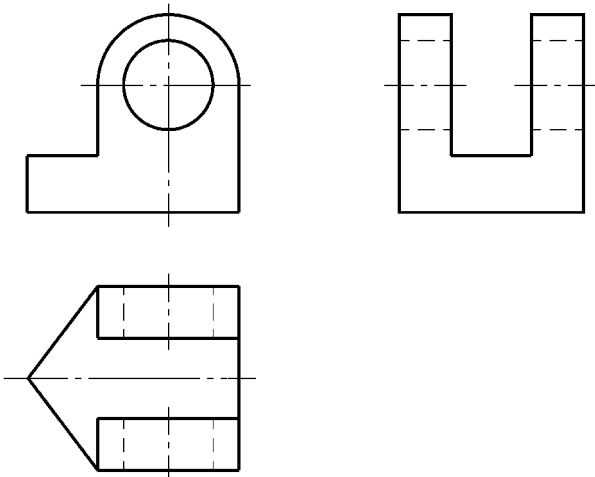
1.



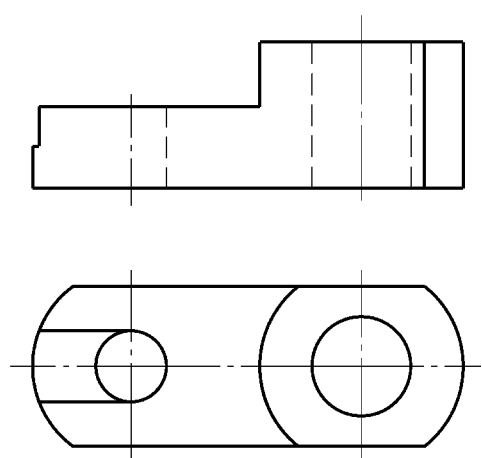
2.



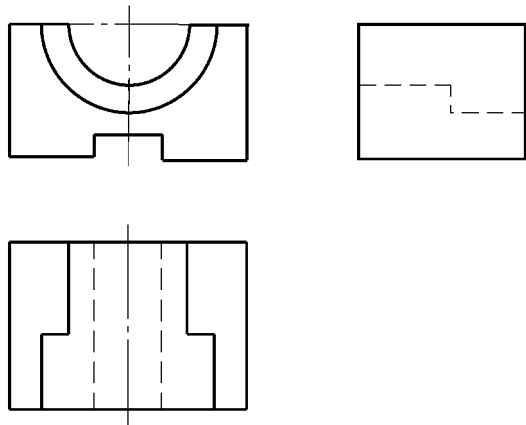
3.



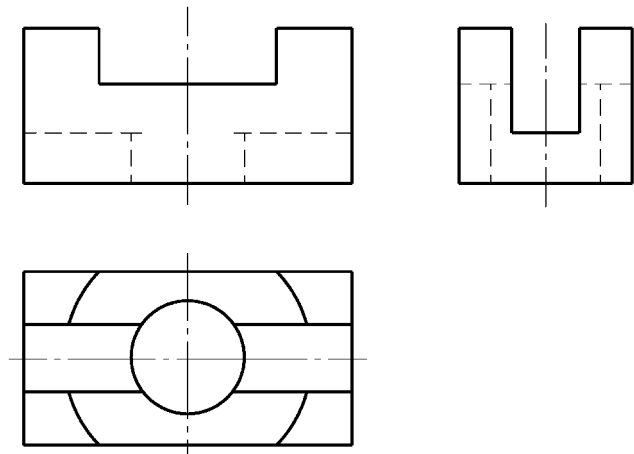
4.



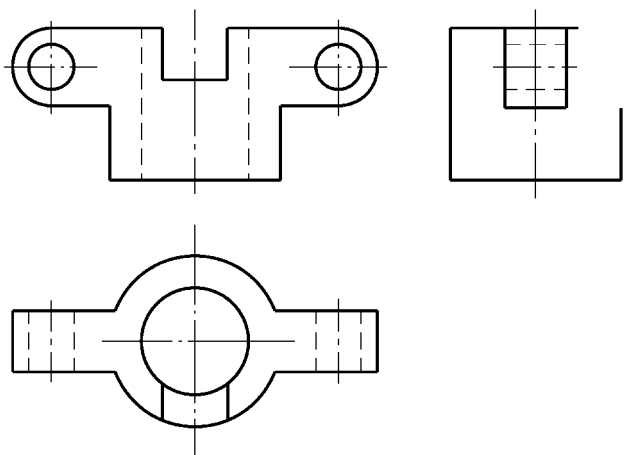
5.



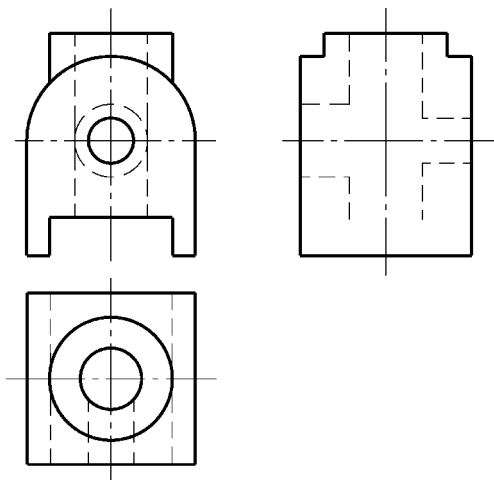
6.



7.

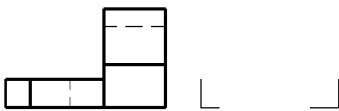


8.

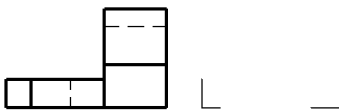


1. Configure different composite solids according to a given front view. 由主视图构思不同组合体。

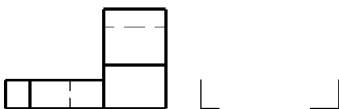
(1)



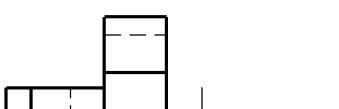
(2)



(3)

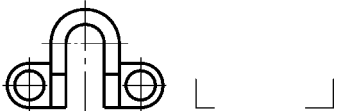


(4)

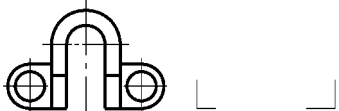


2. Configure different composite solids according to a given front view. 由主视图构思不同组合体。

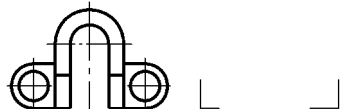
(1)



(2)



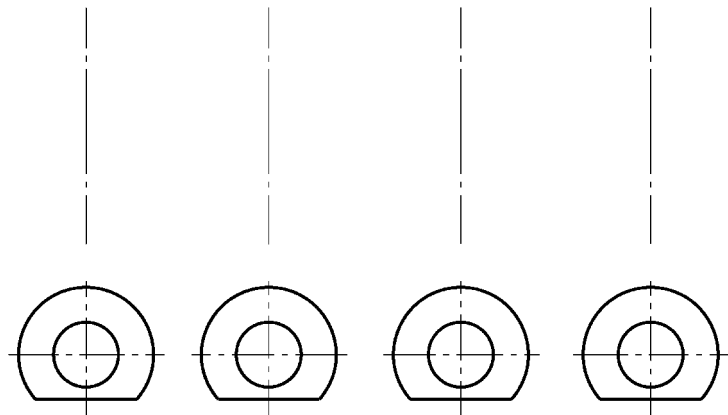
(3)



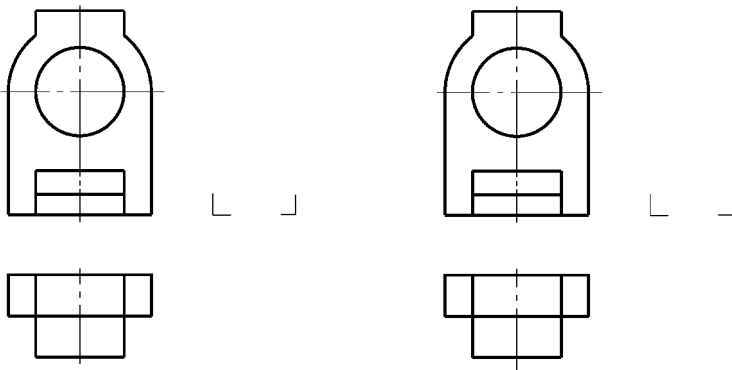
(4)



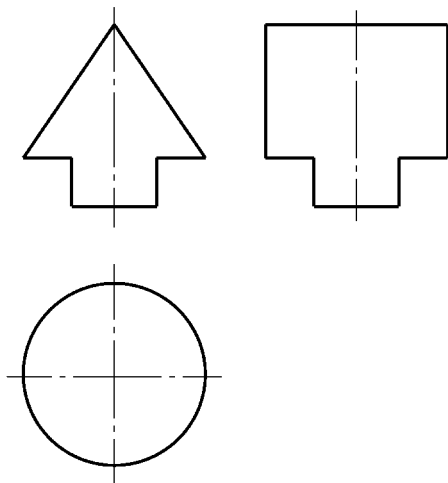
3. Configure different composite solids according to a given top view. 由俯视图构思不同组合体。



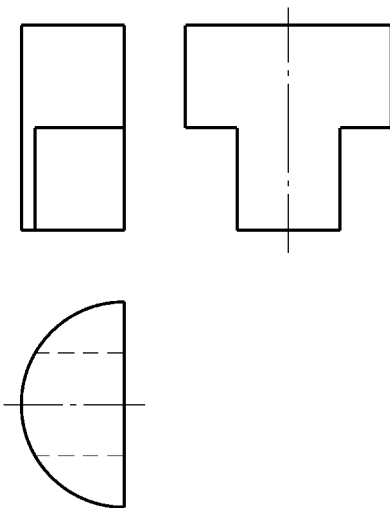
4. Configure different composite solids according to the given front view and top view. 由主、俯视图构思不同组合体。



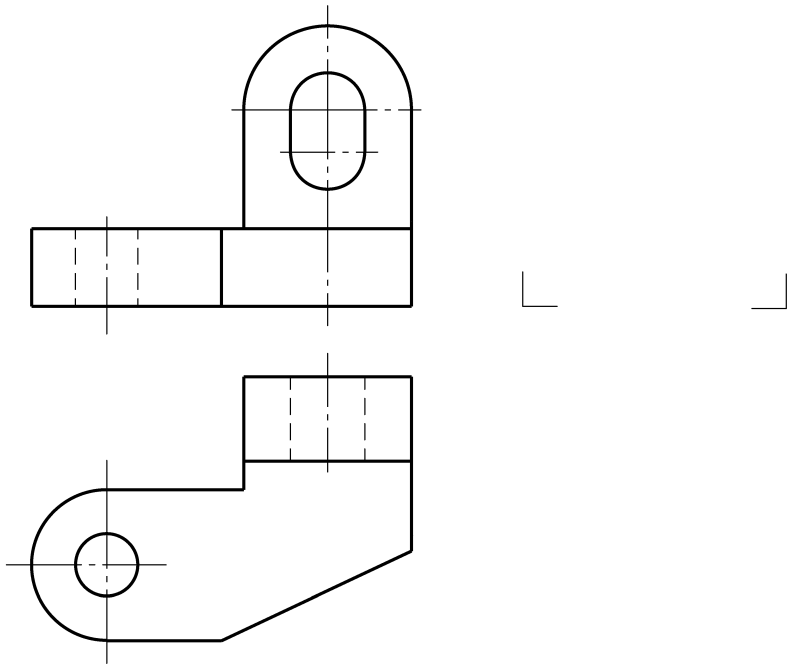
5. Configure a composite solid matching with the given outline. 构思组合体，使其三视图的外轮廓分别与所给的三个图形相同。



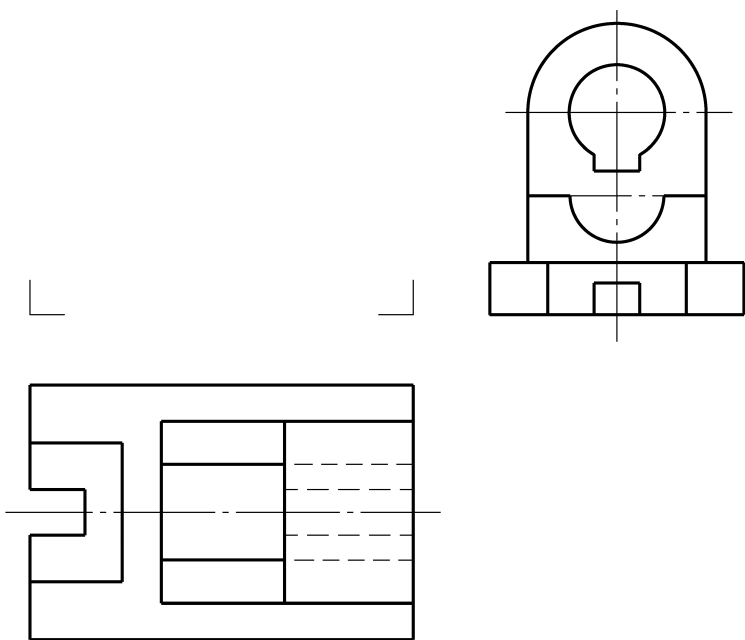
6. Draw three views complementary with the given projections and form a full cylinder. 根据所给的投影图，画出与之互补为一个完整圆柱体的三视图。



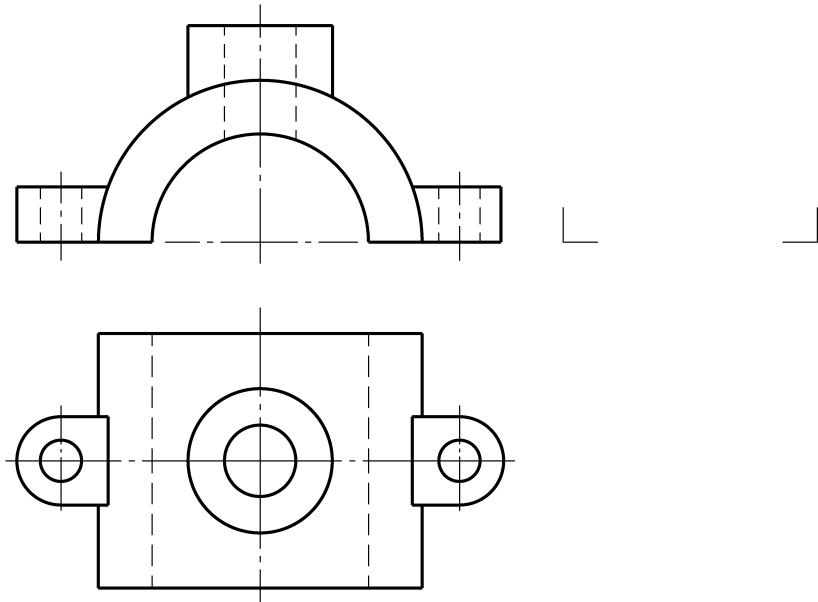
1. Draw the side view. 补画左视图。



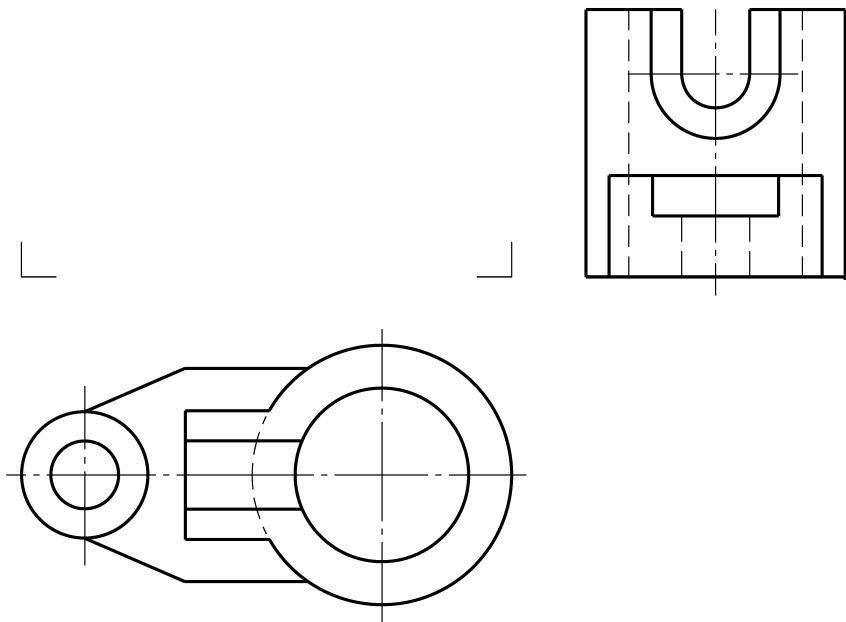
2. Draw the front view. 补画主视图。



3. Draw the side view. 补画左视图。

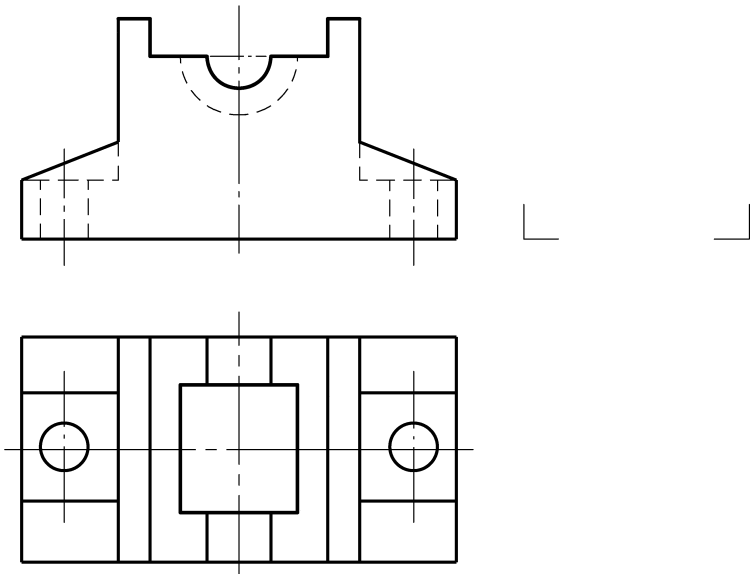


4. Draw the front view. 补画主视图。

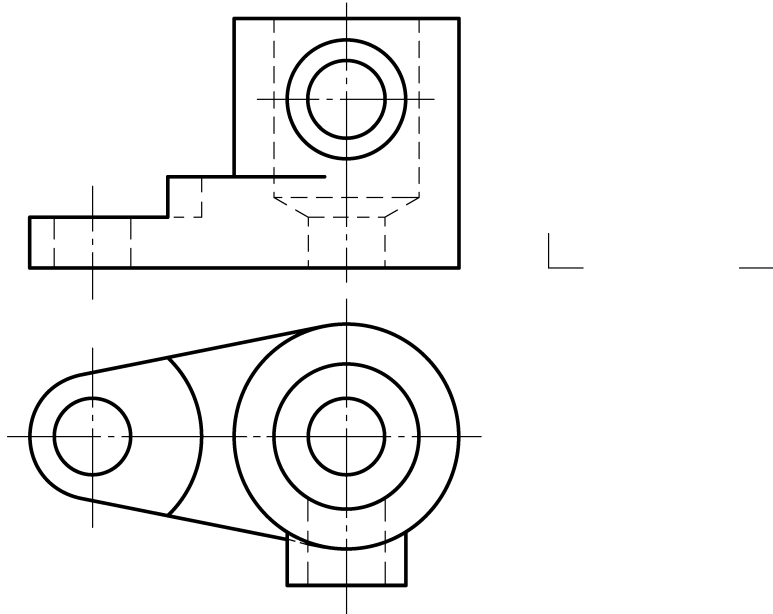


5-3 Shape analysis method 形体分析法 (续)

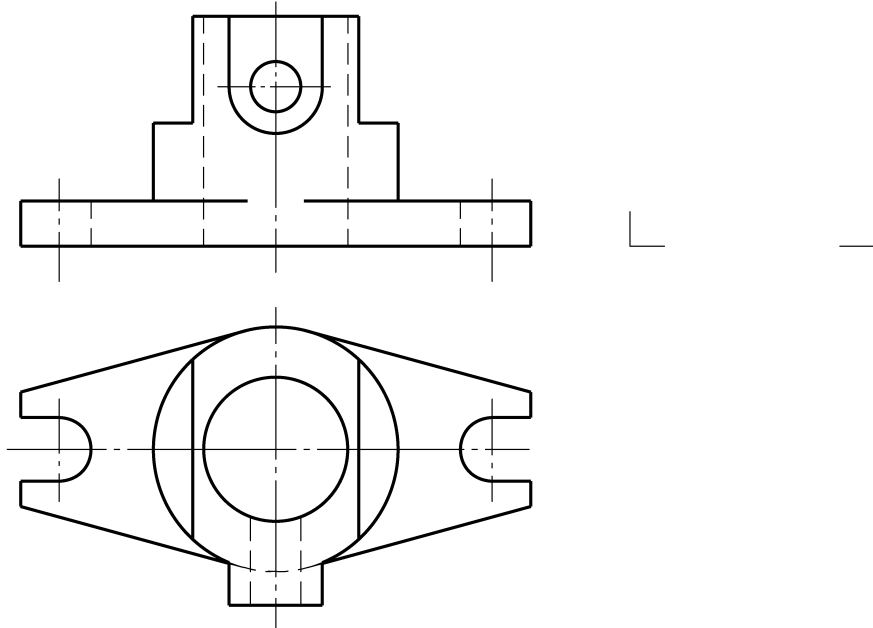
5. Draw the side view. 补画左视图。



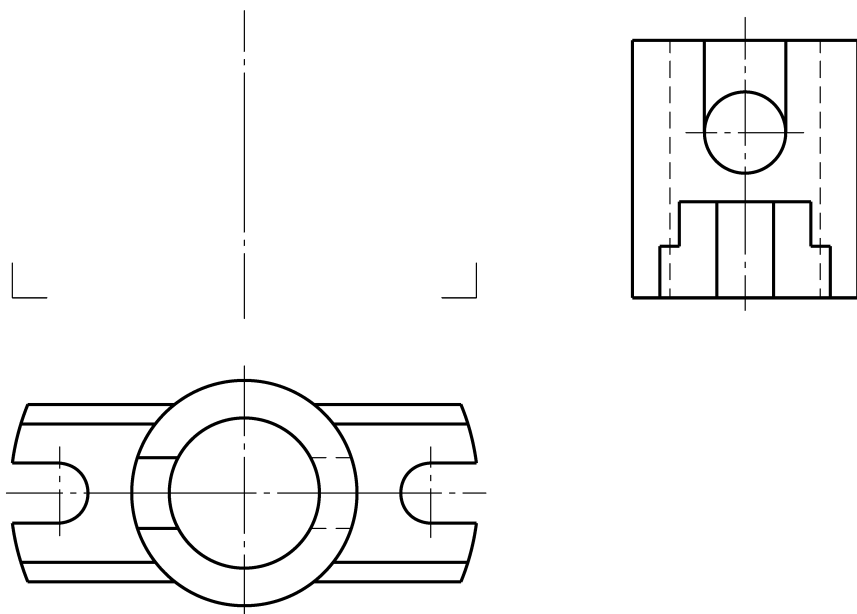
6. Draw the side view. 补画左视图。



7. Draw the side view. 补画左视图。

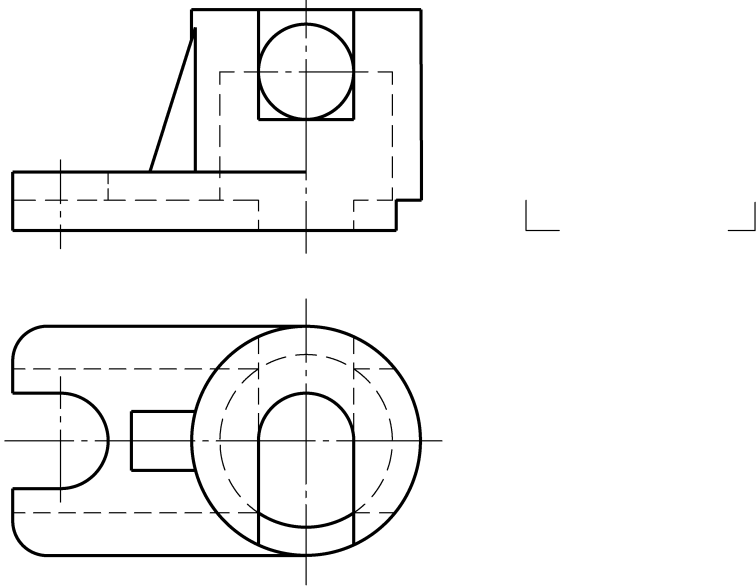


8. Draw the front view. 补画主视图。

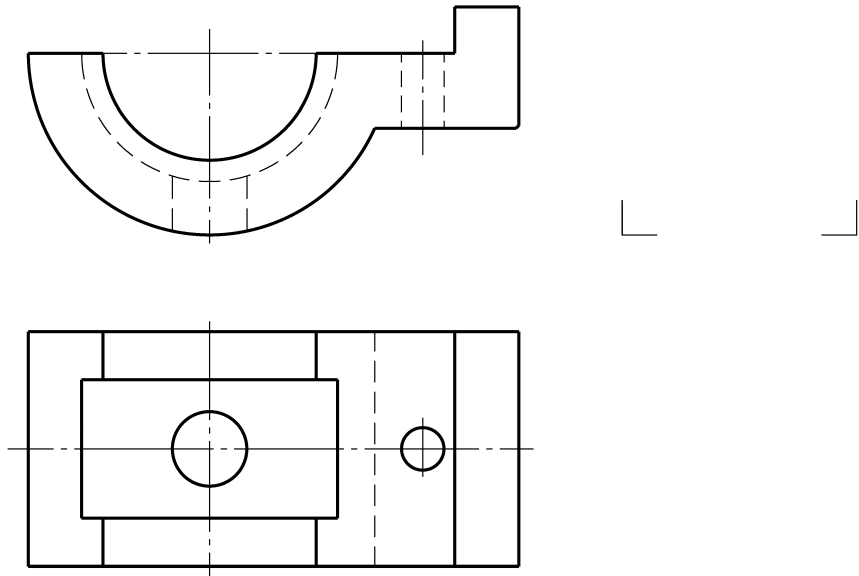


5-3 Shape analysis method 形体分析法 (续)

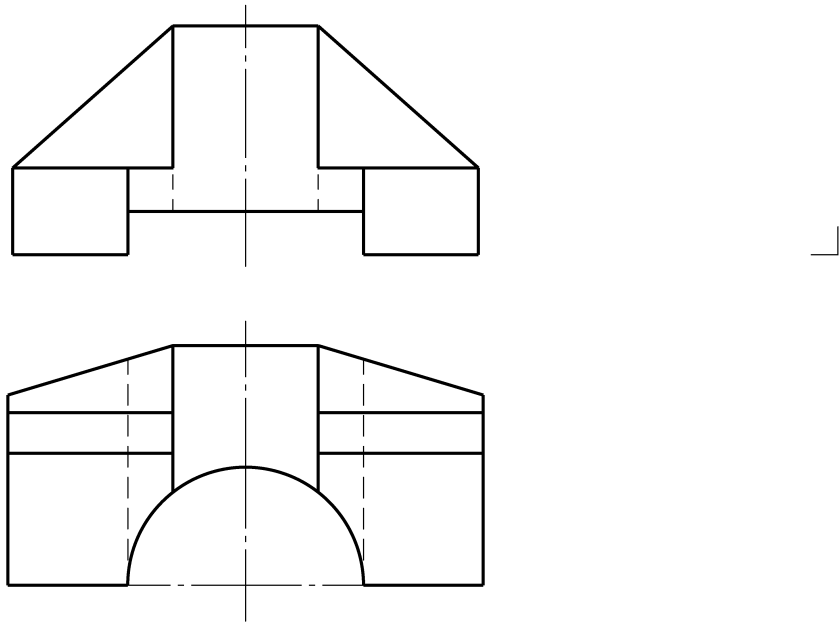
9. Draw the side view. 补画左视图。



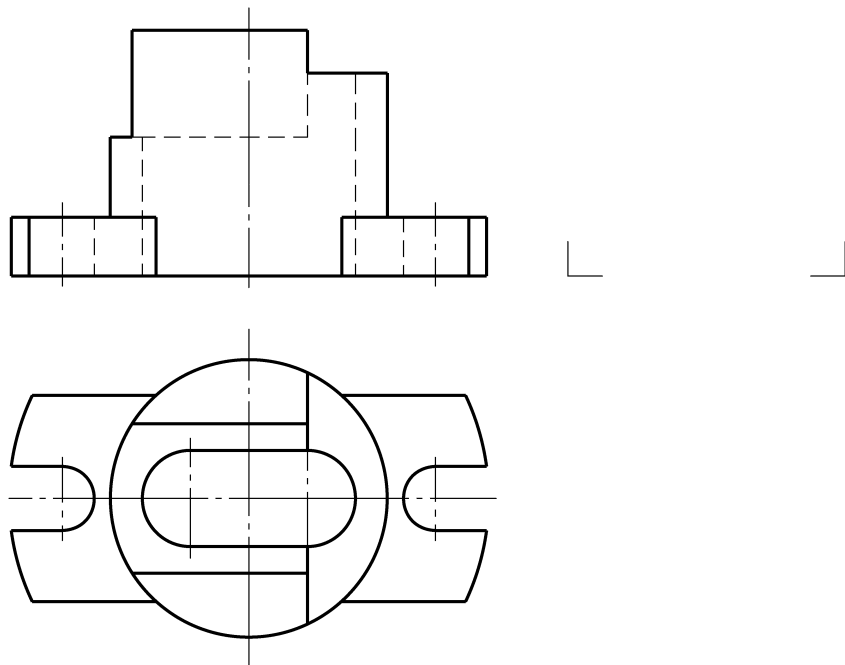
10. Draw the side view. 补画左视图。



11. Draw the side view. 补画左视图。



12. Draw the side view. 补画左视图。

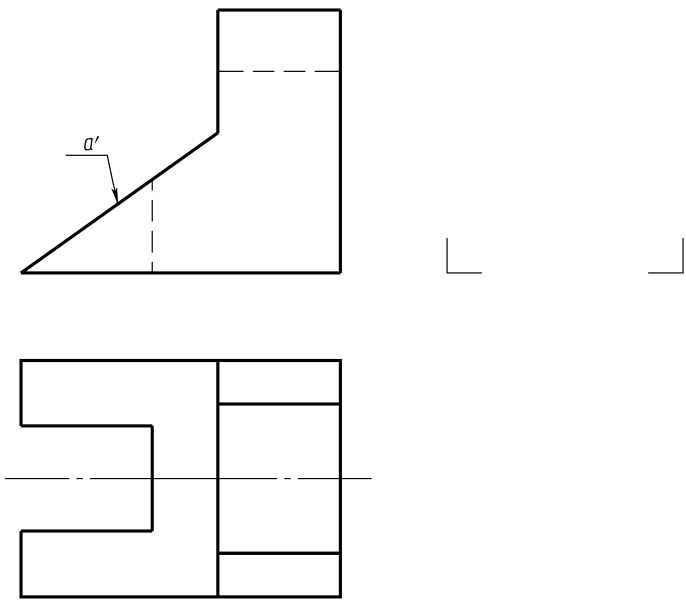


Chapter 5 Composite Solids 组合体

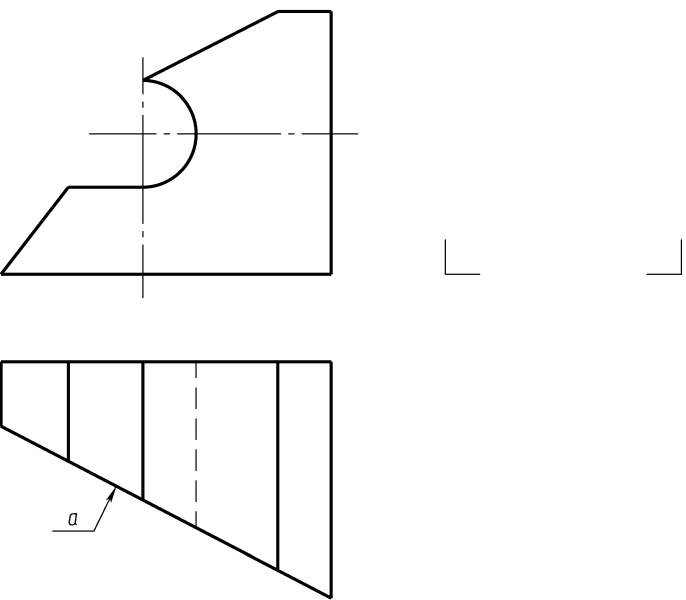
5-4 Line & plane analysis method 线面分析法

32

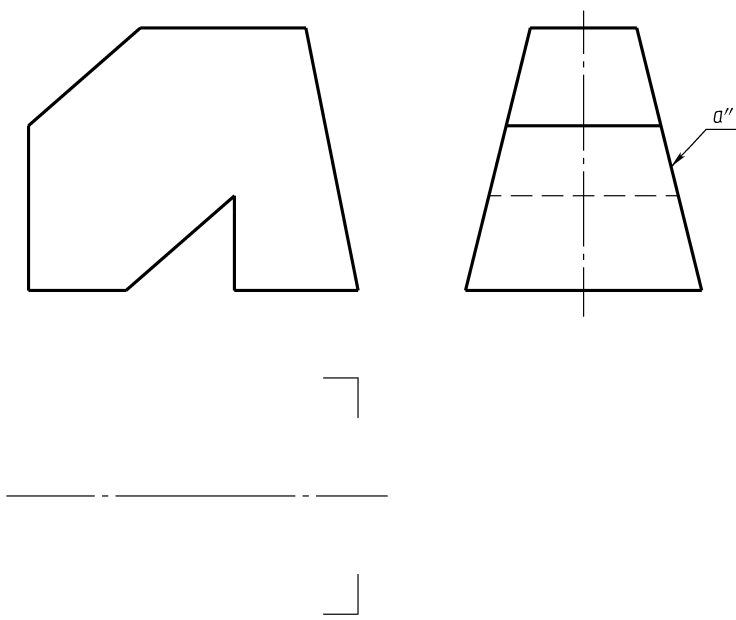
1. Draw the side view and label a and a'' of surface A. 补画左视图并将指定面 A 在其他视图中标出。



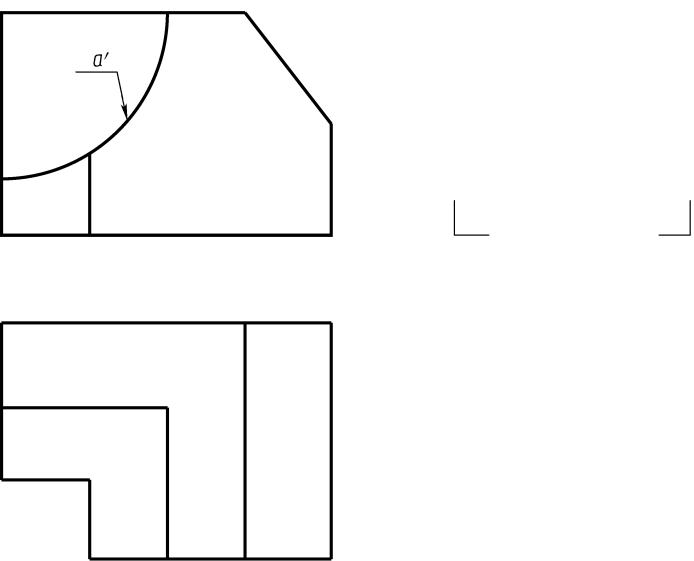
2. Draw the side view and label a' and a'' of surface A. 补画左视图并将指定面 A 在其他视图中标出。



3. Draw the top view and label a and a' of surface A. 补画俯视图并将指定面 A 在其他视图中标出。



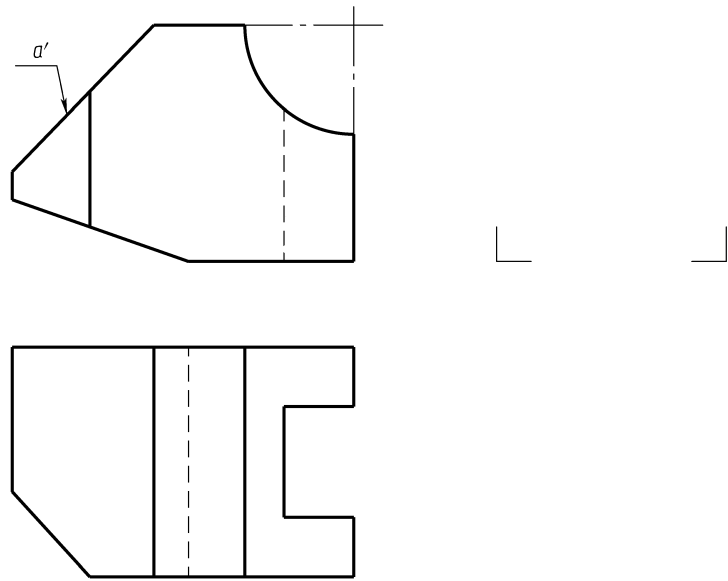
4. Draw the side view and label a and a'' of surface A. 补画左视图并将指定面 A 在其他视图中标出。



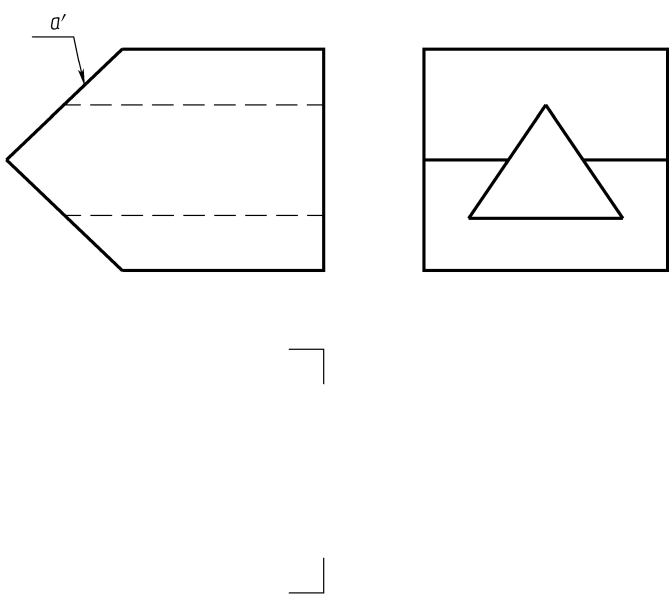
Chapter 5 Composite Solids 组合体

5-4 Line & plane analysis method 线面分析法 (续)

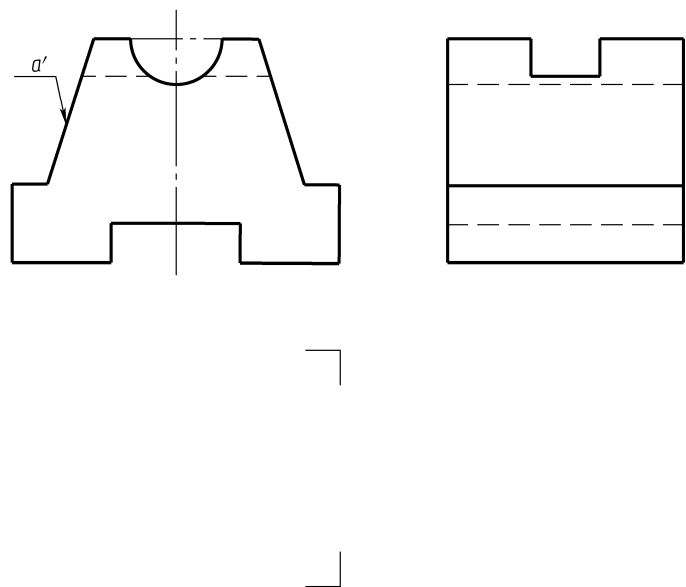
5. Draw the side view and label a and a'' of surface A. 补画左视图并将指定平面 A 在其他视图中标出。



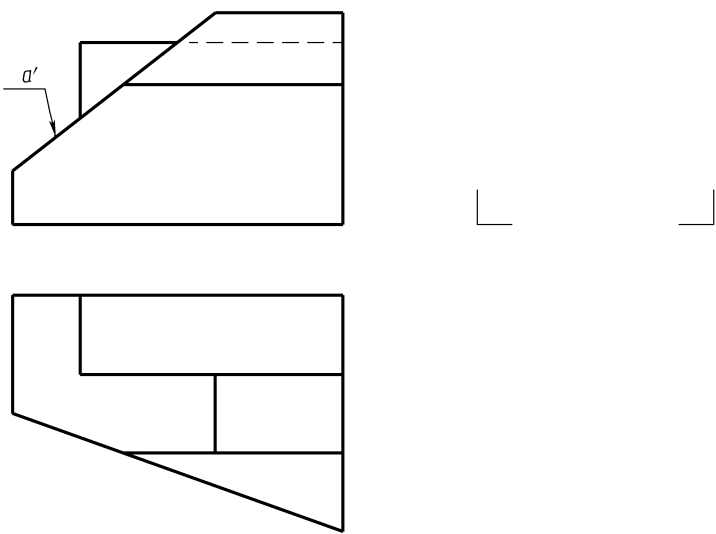
6. Draw the top view and label a and a'' of surface A. 补画俯视图并将指定平面 A 在其他视图中标出。



7. Draw the top view and label a and a'' of surface A. 补画俯视图并将指定平面 A 在其他视图中标出。



8. Draw the side view and label a and a'' of surface A. 补画左视图并将指定平面 A 在其他视图中标出。



Class

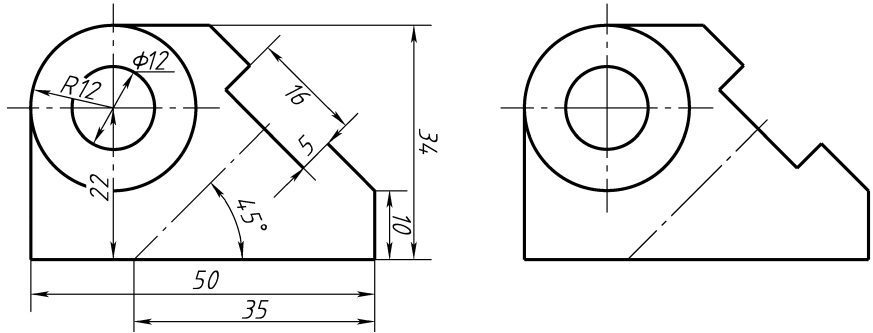
Stu No.

Name

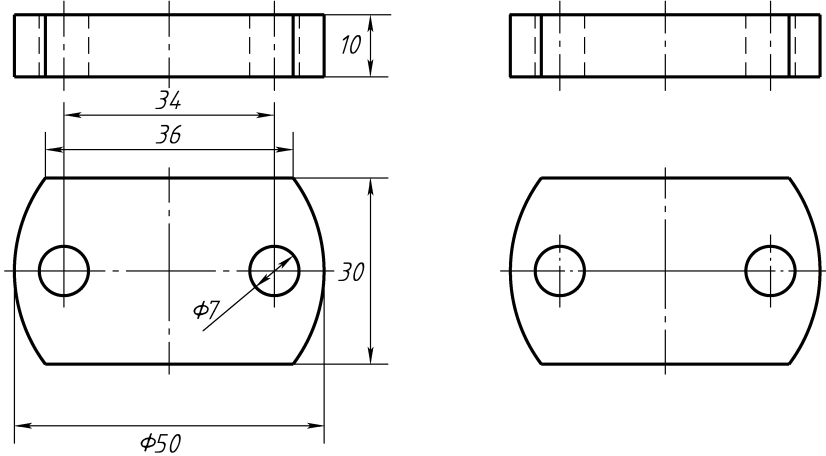
5-5 Dimension of composite solids 组合体尺寸标注

1. Check dimension errors and correct them on the right figure. 检查图中尺寸标注的错误，并用正确的方法标注在右图中。

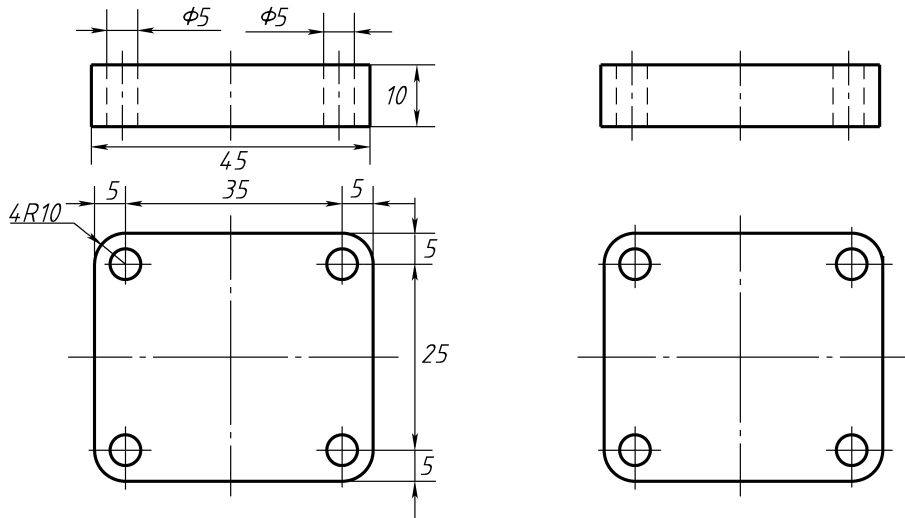
(1)



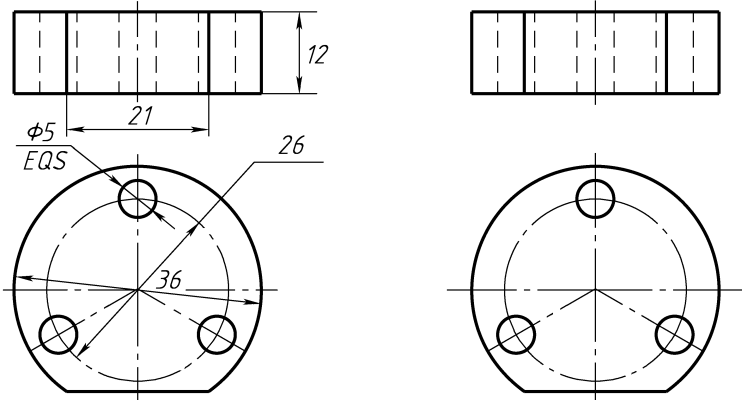
(2)



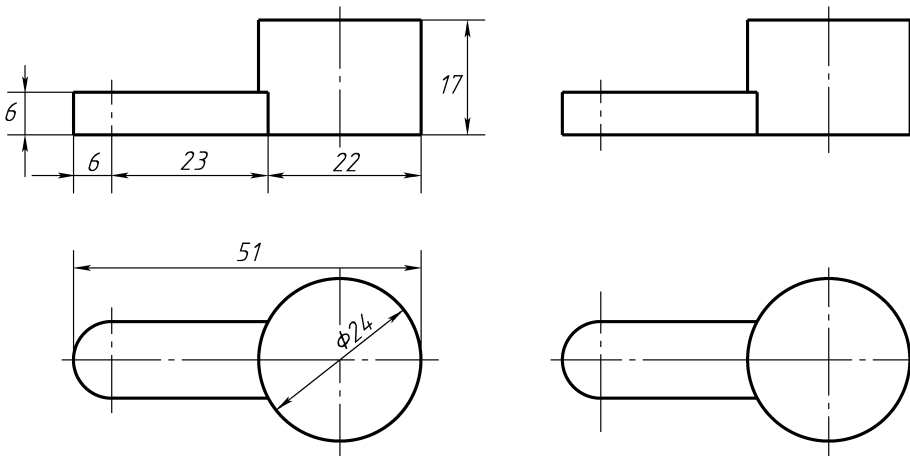
(3)



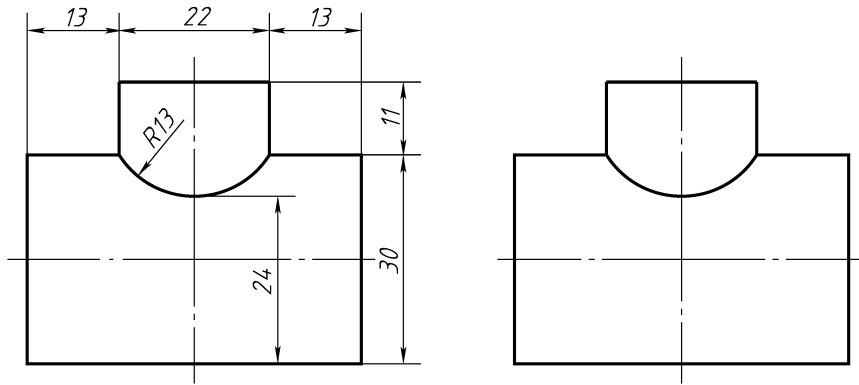
(4)



(5)



(6)



Chapter 5 Composite Solids 组合体

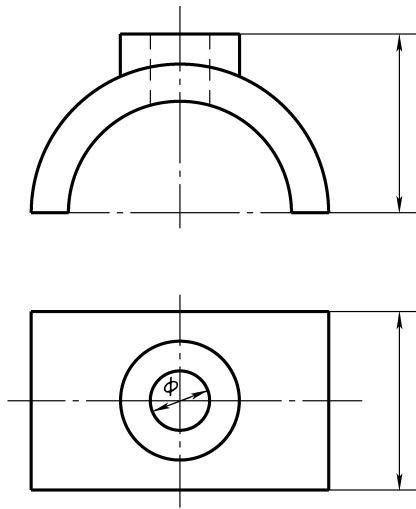
5-5 Dimension of composite solids 组合体尺寸标注 (续)

35

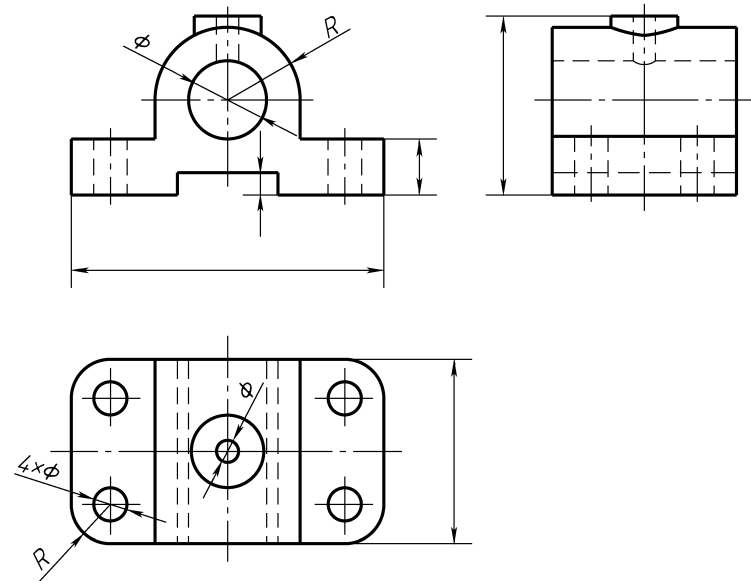
2. Complete the missing dimensions of composite solids (obtain sizes by measurement and retain the integer). 补全组合体所缺尺寸 (尺寸数值从图中量取并取整)。

3. Answer questions. 回答问题。

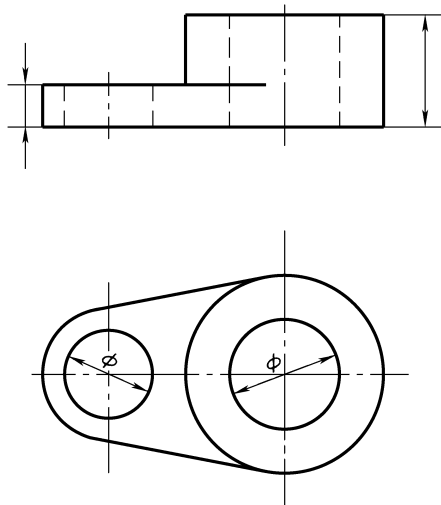
(1)



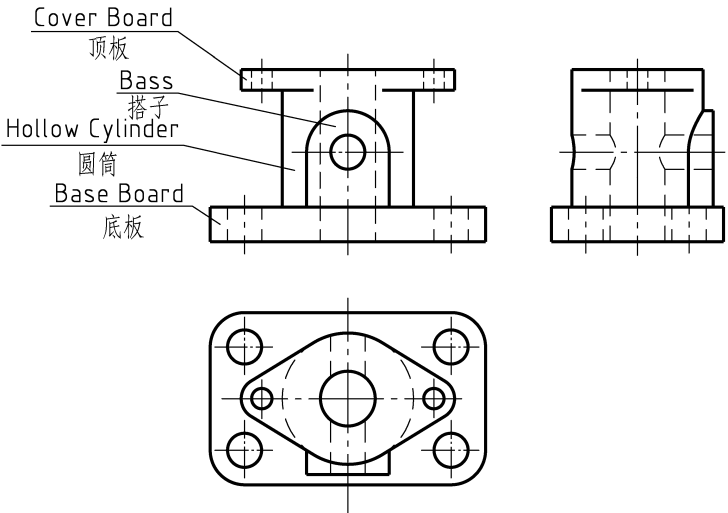
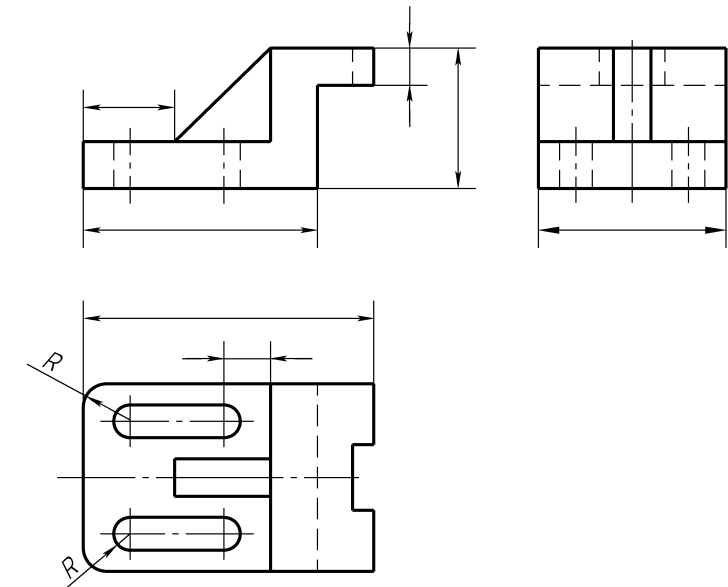
(3)



(2)



(4)



(1) The composite solid has _____ basic solids. 该组合体可分解为 _____ 个基本形体。

(2) The relative positions of the hollow cylinder surfaces and bass surface are _____ and _____. 圆筒与搭子表面之间的关系, 既有 _____ 又有 _____。

(3) The configuration form of the cover board and the hollow cylinder is _____. 顶板和圆筒的组合形式是 _____。

(4) The configuration form of the base board and the hollow cylinder is _____. 底板与圆筒的组合形式是 _____。

(5) Mark the location dimensions of the composite solid in views. 在图中标出该组合体的定位尺寸。

(6) Mark the main dimension datum for the length, the width and the height of the composite solid using leaders and arrows. 用指引线和箭头在图上标明长、宽、高三个方向的主要尺寸基准。

Class

Stu No.

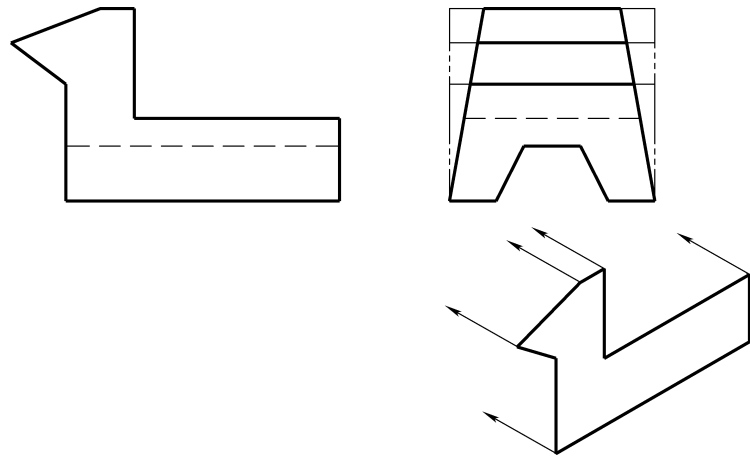
Name

Chapter 5 Composite Solids 组合体

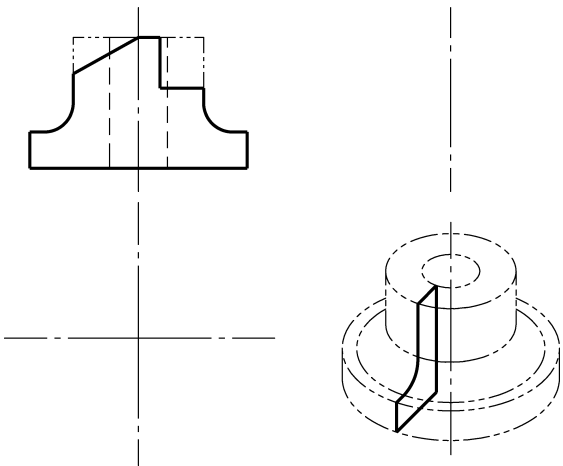
5-6 3D modeling and drawing three views 3D 建模绘制三视图

36

1. Create an extrude solid by sketch and draw the top view after cutting. 按草图截面构造拉伸体，截切后画出俯视图。



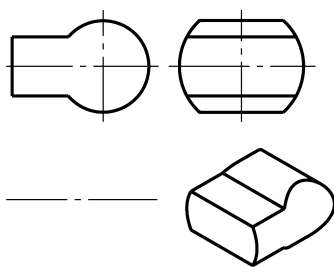
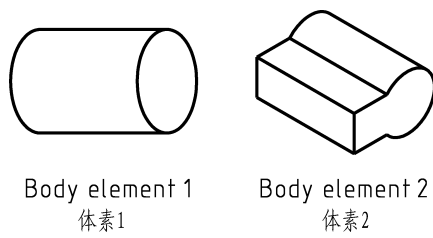
2. Create a revolution body by sketch and draw the top view and side view after cutting. 按草图截面及轴线构造回转体，截切后补画俯视图、左视图。



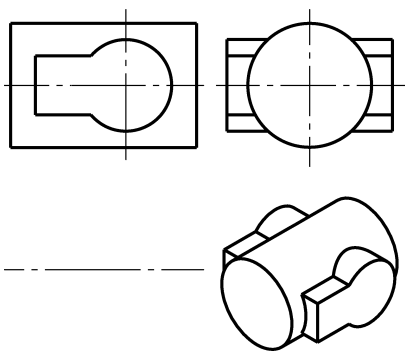
3. Complete Boolean operation by given body elements. Think about the results when the shape, size and relative position of body elements change. 根据给定体素，作并交差布尔运算。尝试变化体素 1、2 的形状、大小、相对位置会怎样？记录结果。

(1) Given body elements. 已知体素。

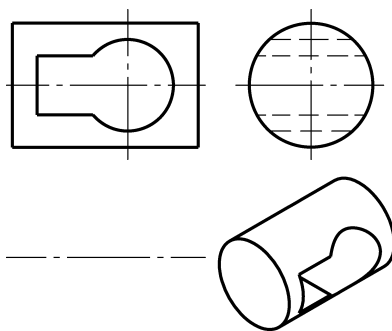
(2) Given body element $1 \cap 2$, draw the top view. 体素 $1 \cap$ 体素 2，求俯视图。



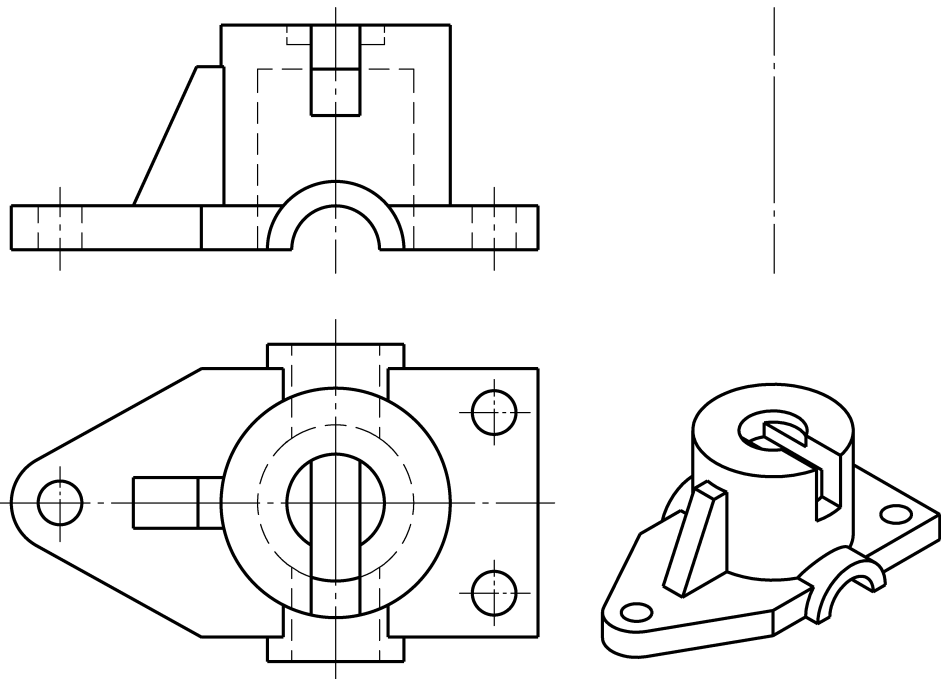
(3) Given body element $1 \cup 2$, draw the top view. 体素 $1 \cup$ 体素 2，求俯视图。



(4) Given body element $1 - 2$, draw the top view. 体素 $1 -$ 体素 2，求俯视图。



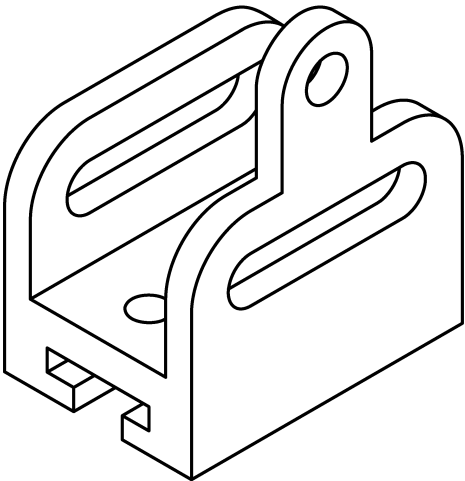
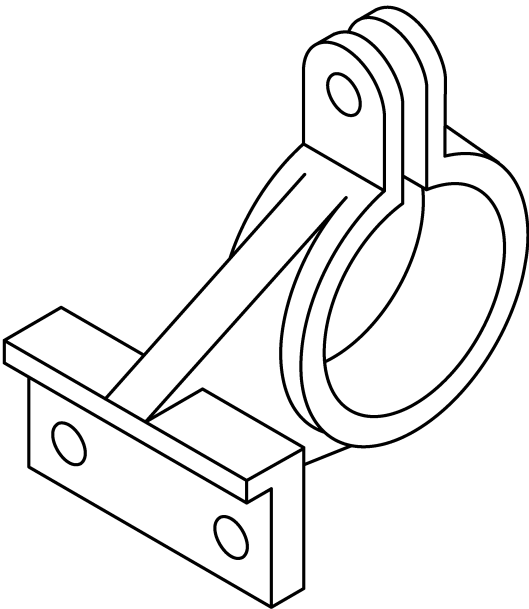
4. Analyze body elements, configuration method, and intersection lines according to the given views, and draw the side view. 根据已知的两视图，分析体素、构形方式及构形过程中产生的交线，并补画左视图。



Class

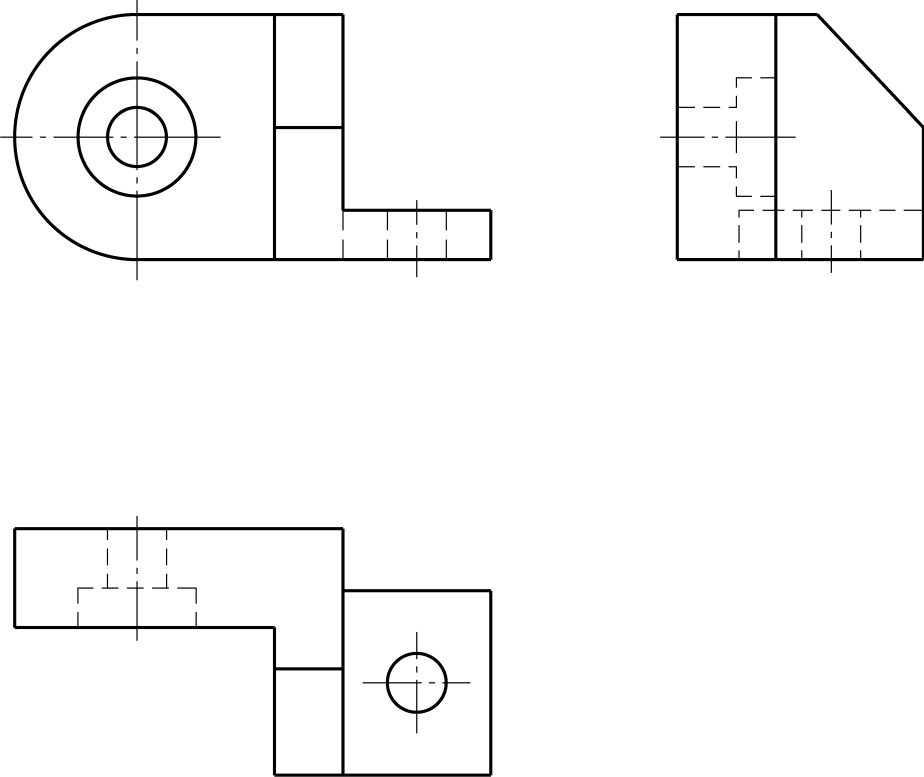
Stu No.

Name



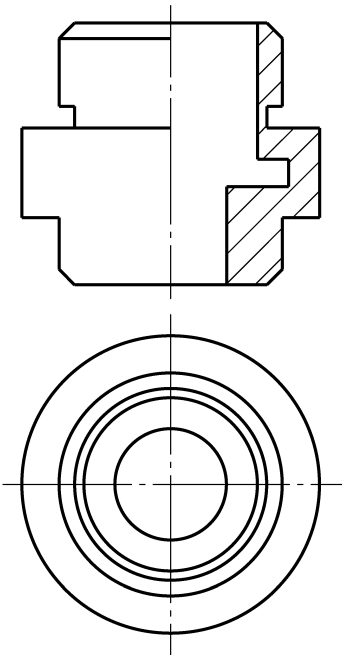
6-1 Basic views 基本视图

Read the given three views and complete the other three basic views. 看懂三视图，补全其余三个基本视图。

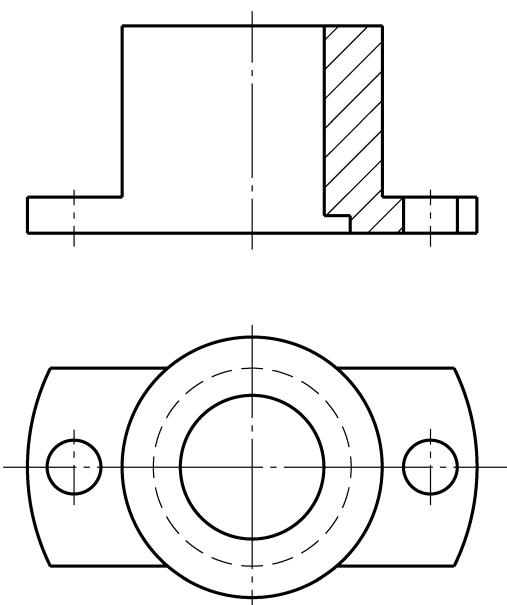


6-2 Add the missing details 补画所缺图线

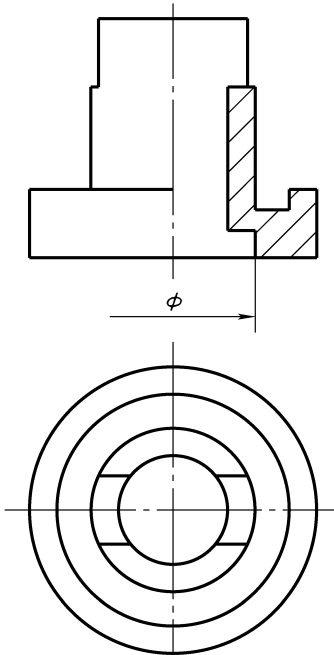
1.



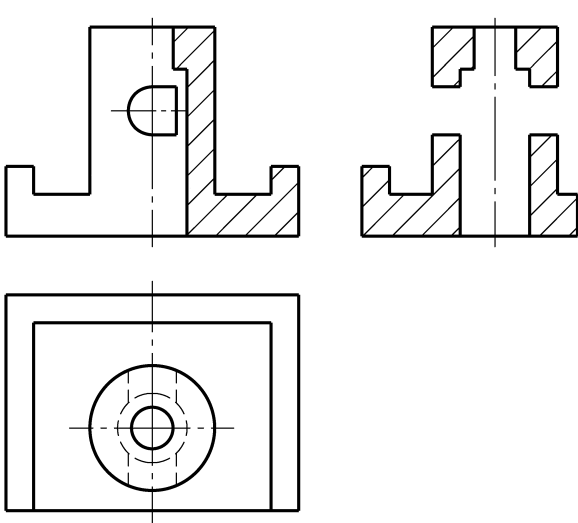
2.



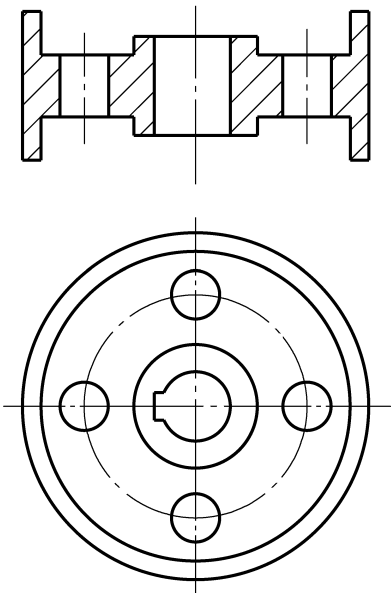
3.



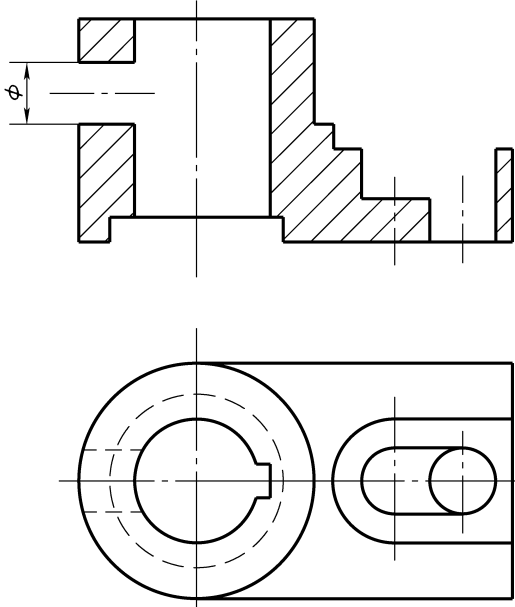
4.



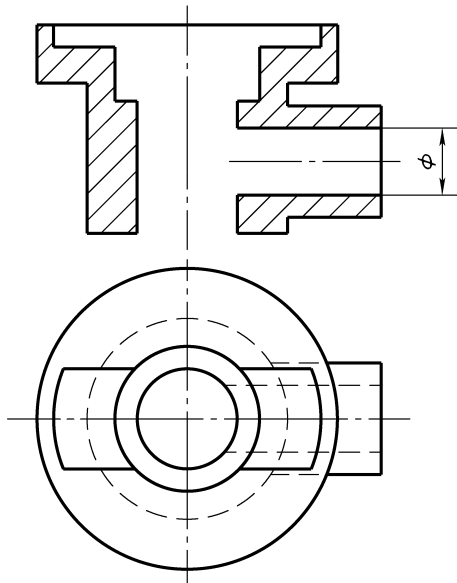
5.



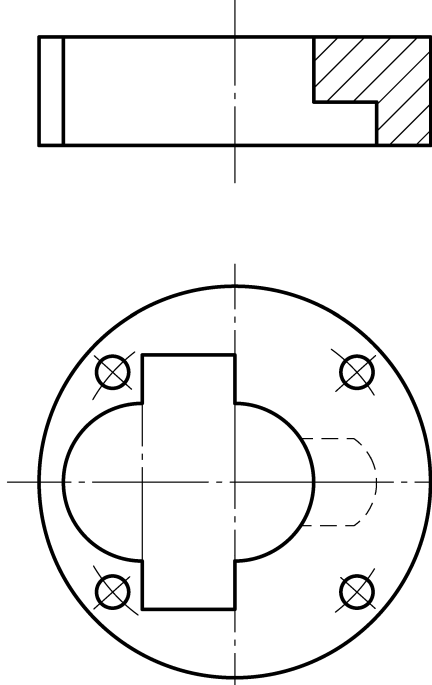
6.



7.



8.



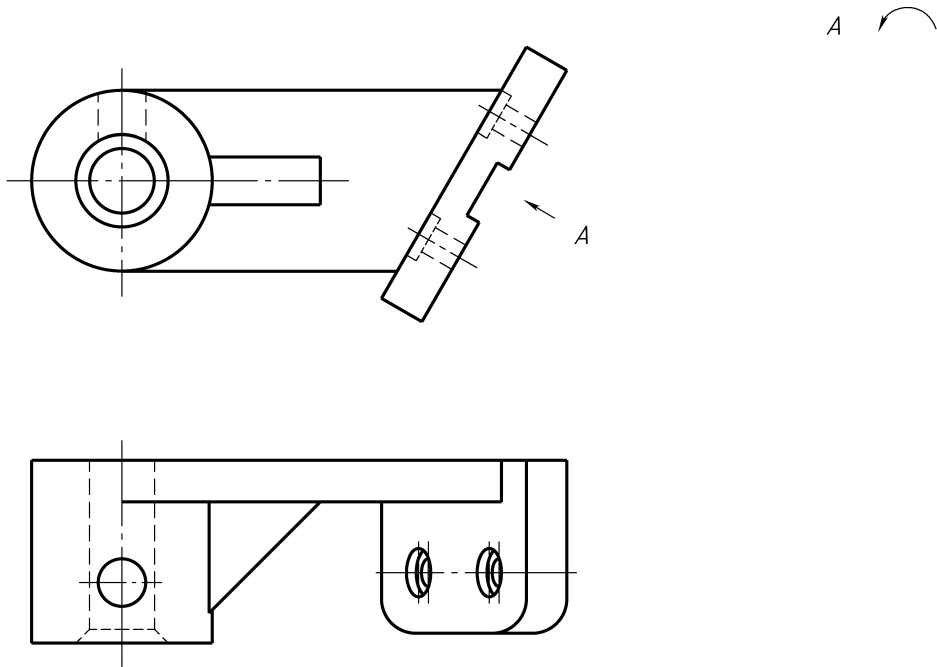
Class

Stu No.

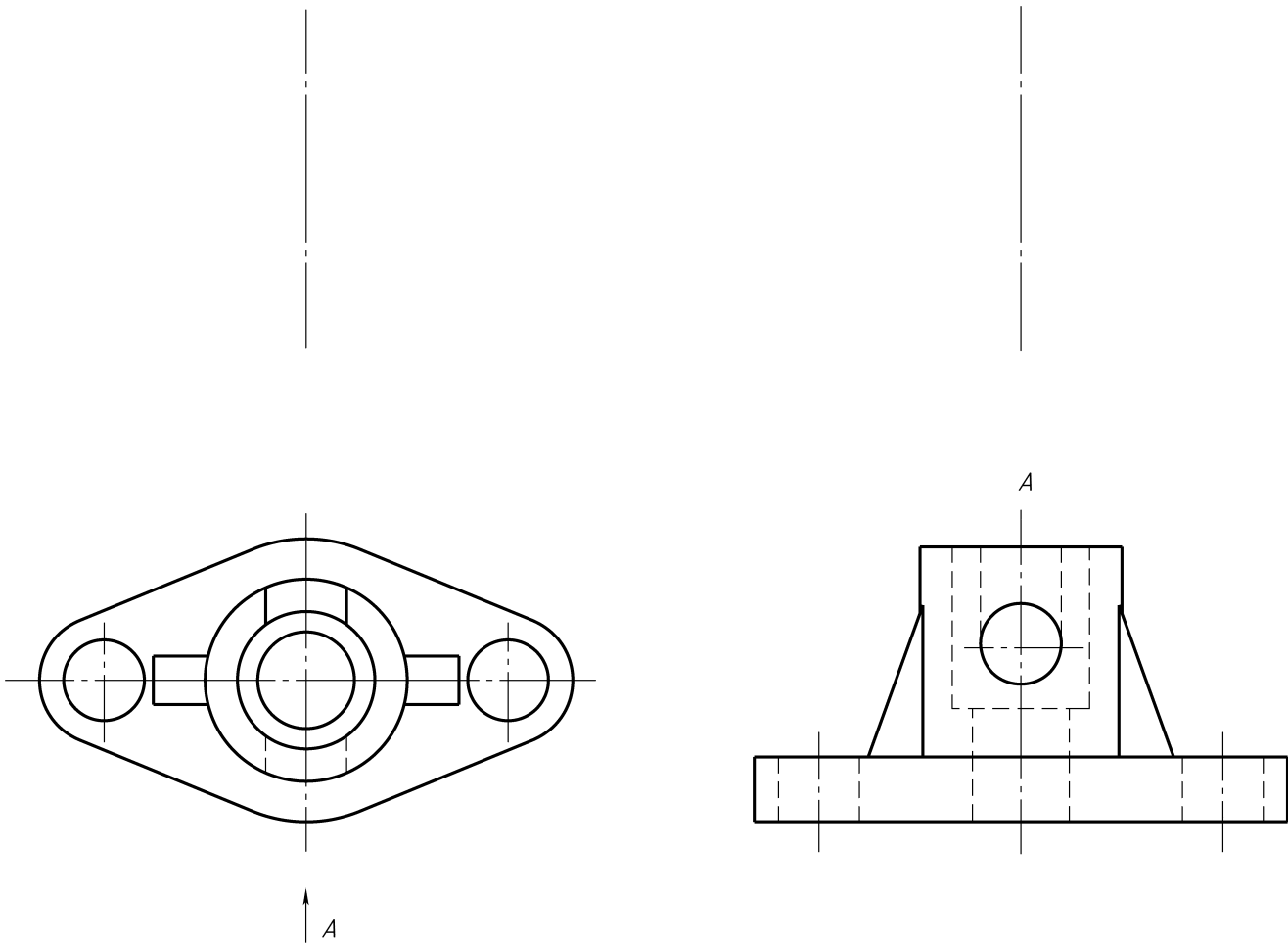
Name

6-3 Sectional views 剖视图

1. Draw an inclined view from *A* at the indicated position (round radius of the right mounting plate is 5mm) . 在指定位置画出 *A* 向斜视图 (右端安装板圆角半径为 5mm)。

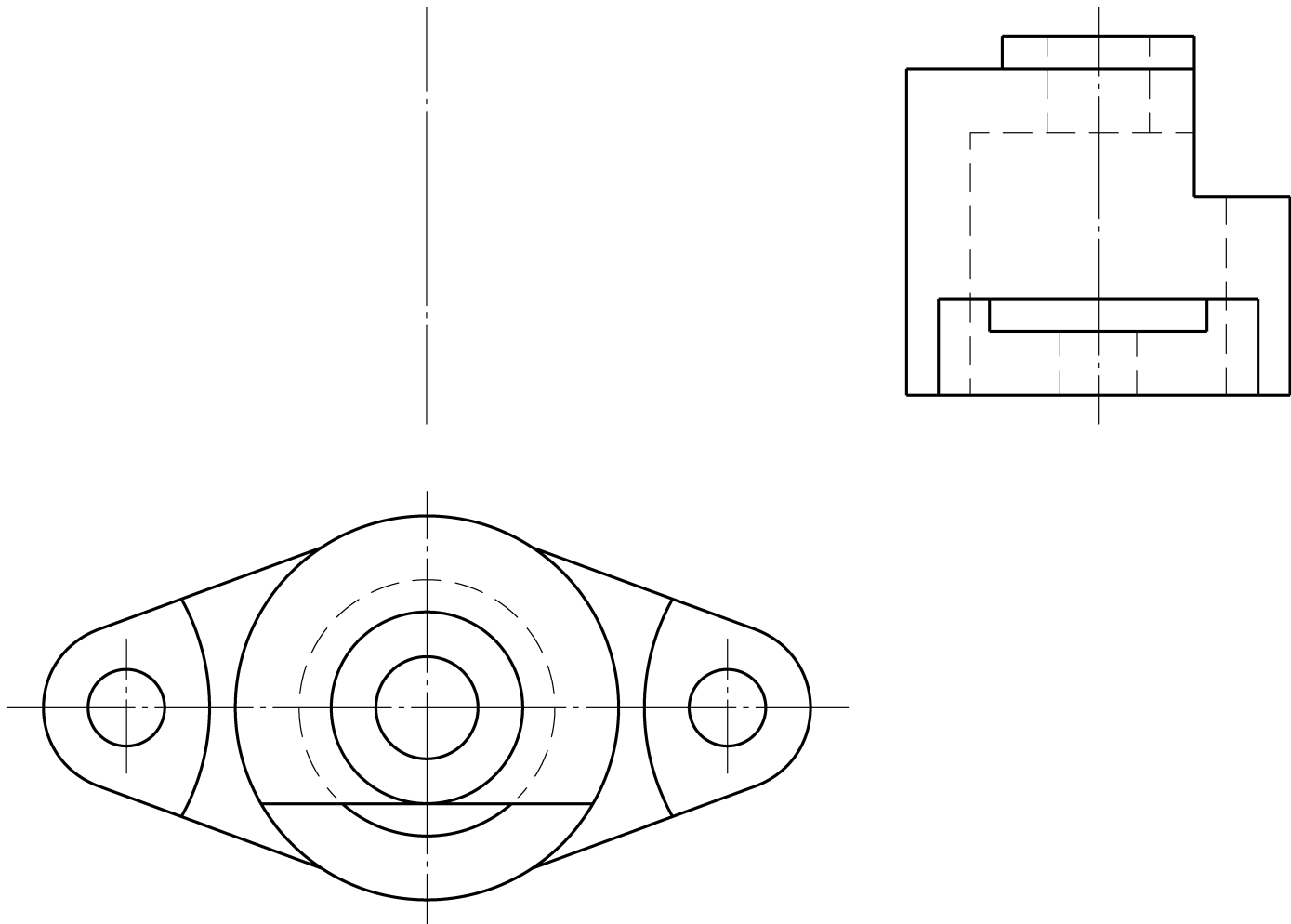


2. Draw a half sectional front view and a full sectional side view given the top view and the inclined view from *A*. 已知俯视图和 *A* 向视图，画出半剖的主视图和全剖的左视图。

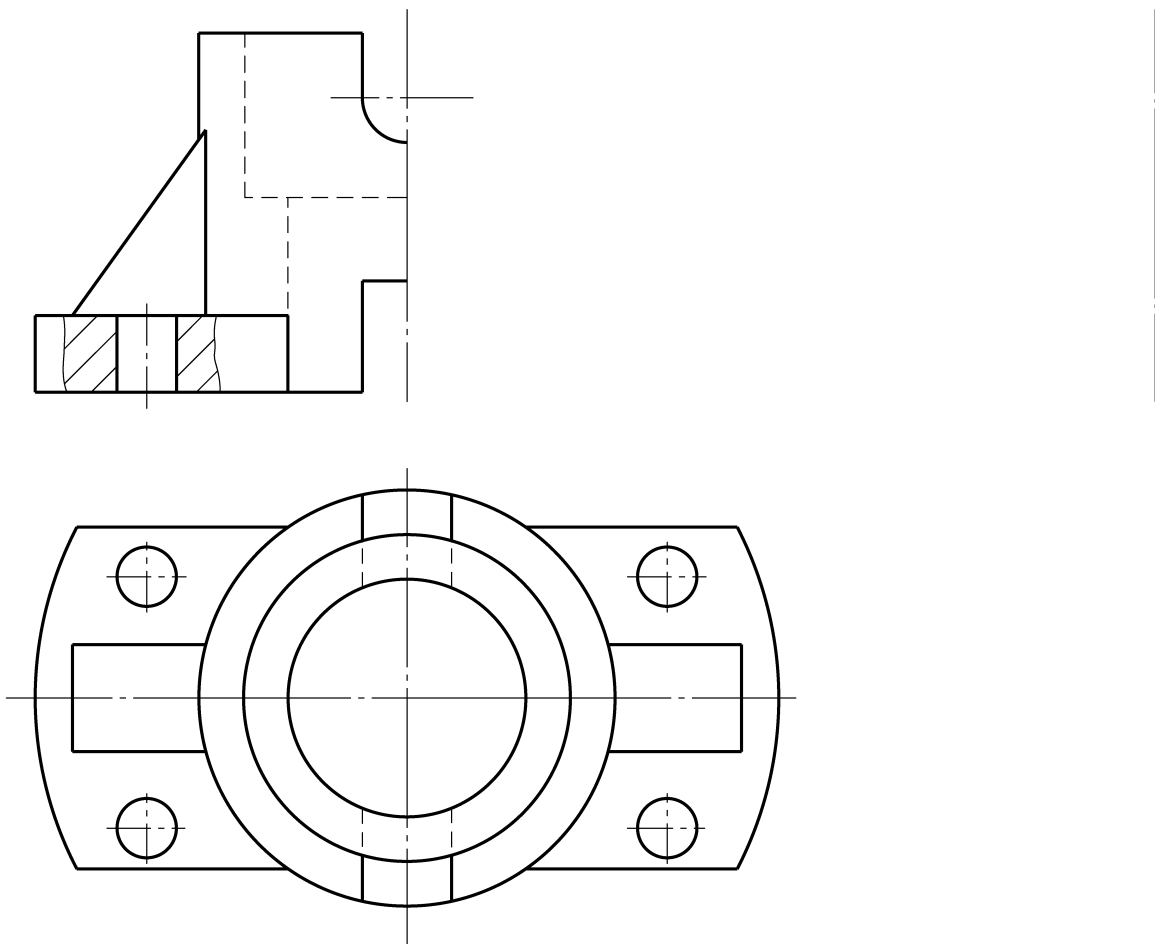


6-3 Sectional views 剖视图（续）

3. Draw a half sectional front view. 补画半剖主视图。



4. Draw a half sectional front view and a half sectional side view. 补画半剖主视图和半剖左视图。



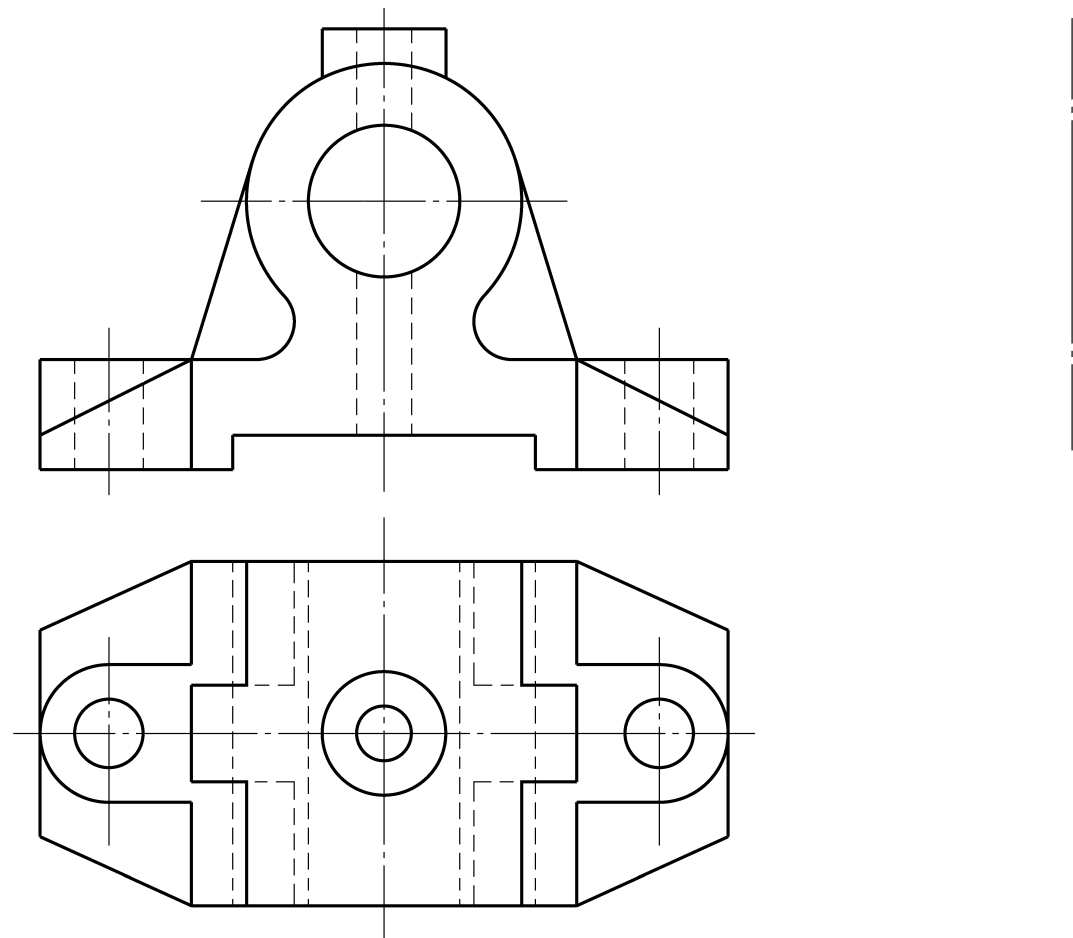
Class

Stu No.

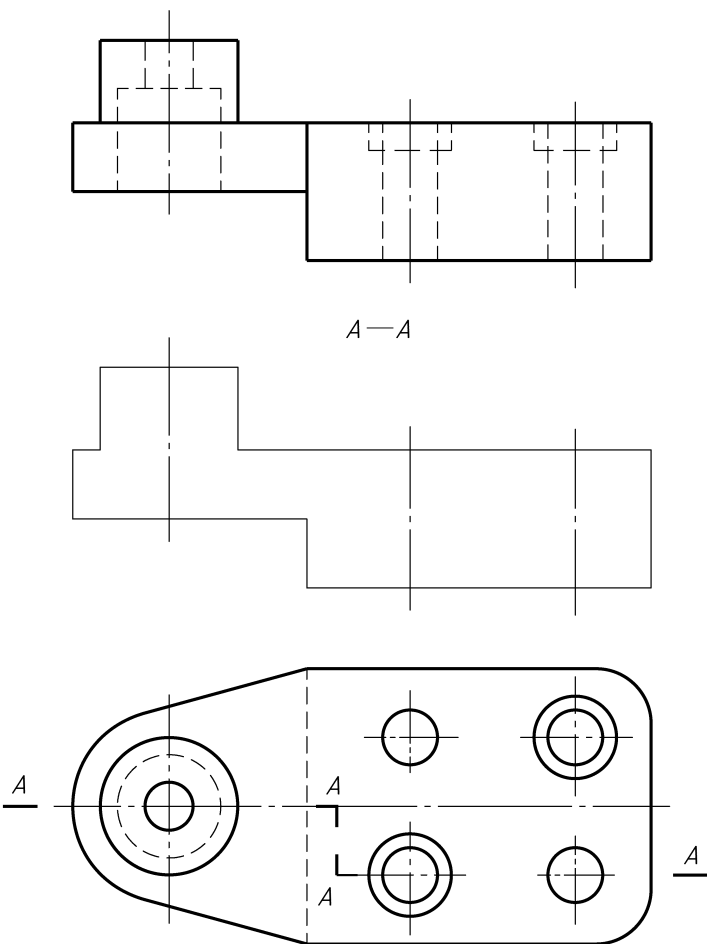
Name

6-3 Sectional views 剖视图（续）

5. Draw a half sectional side view. 补画半剖左视图。

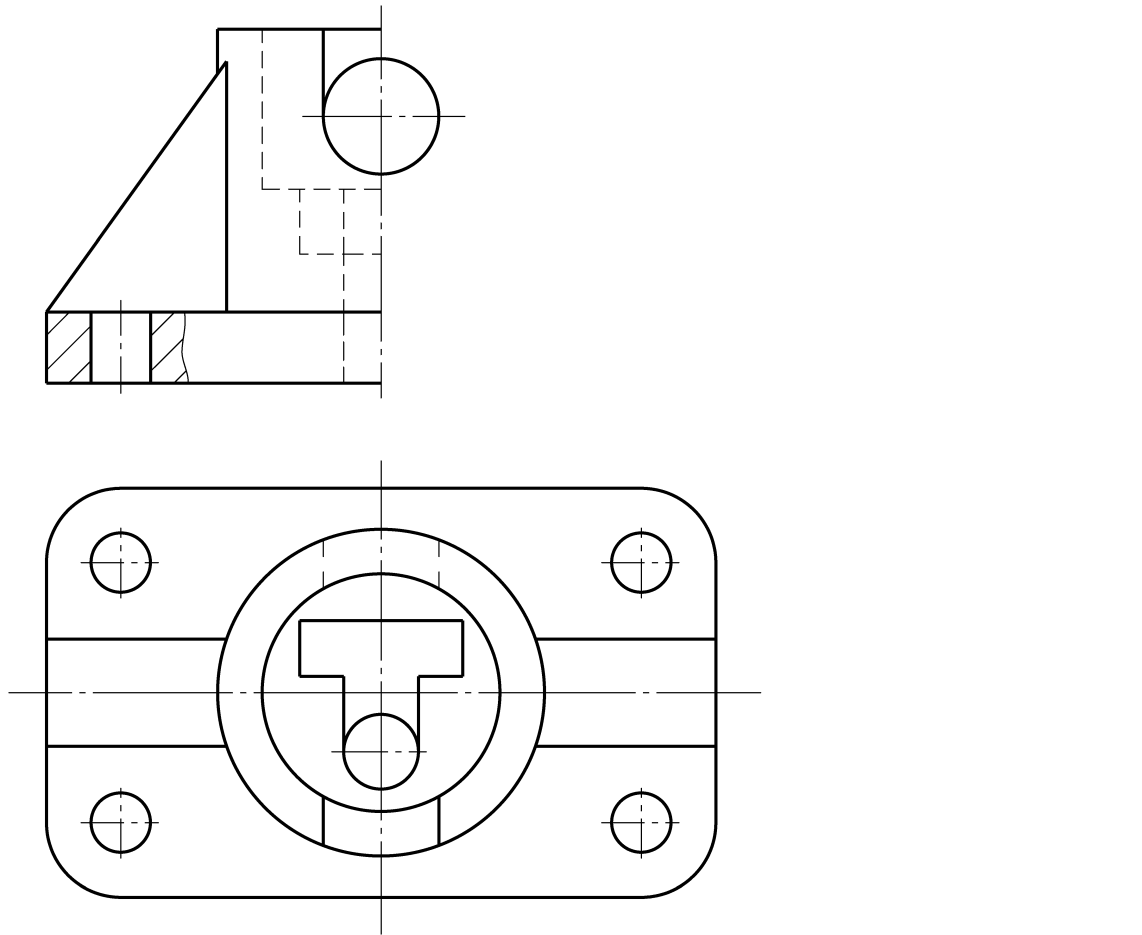


6. Change the front view into an offset sectional view. 将主视图画成阶梯剖视图。

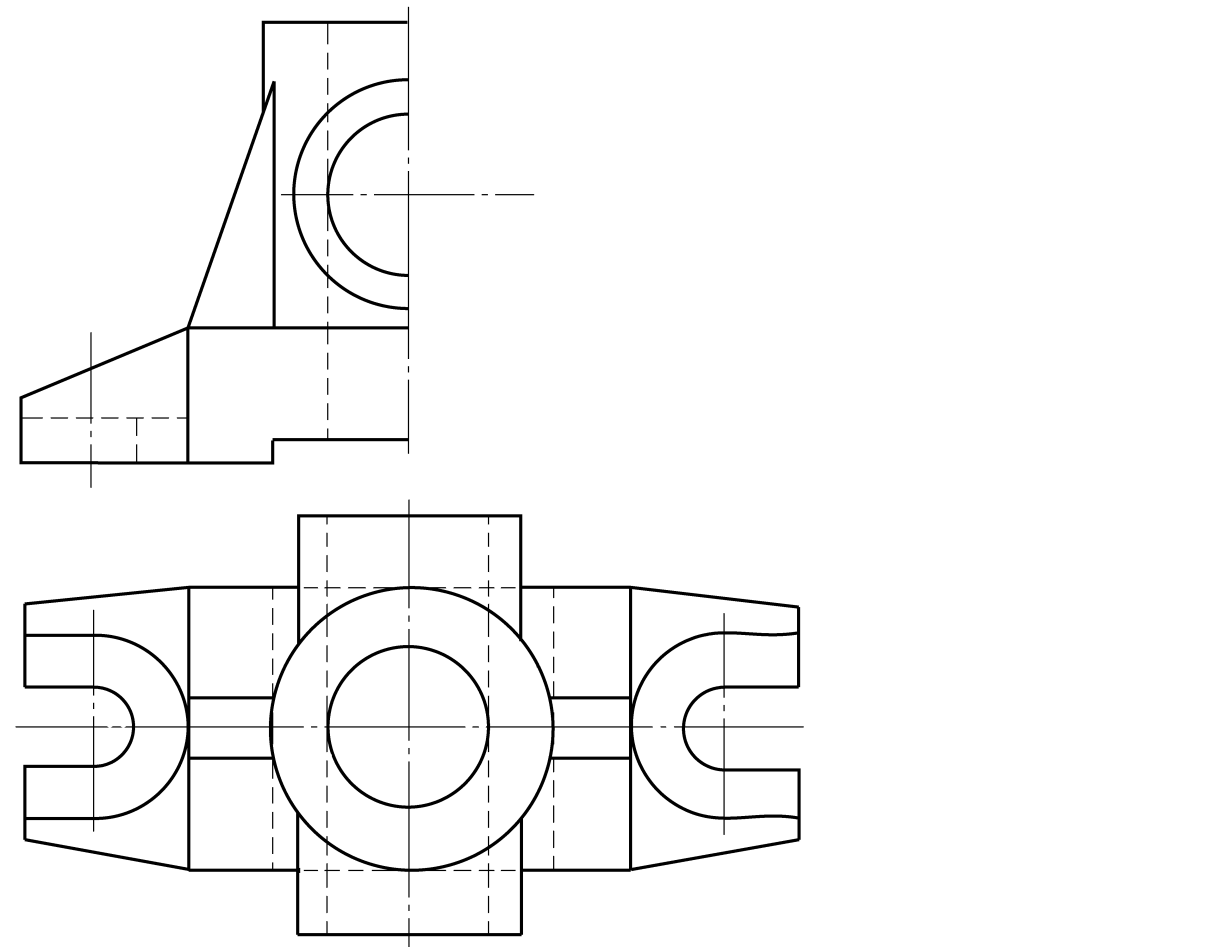


6-3 Sectional views 剖视图（续）

7. Draw a half sectional front view and draw a full sectional side view. 补画半剖主视图和全剖左视图。

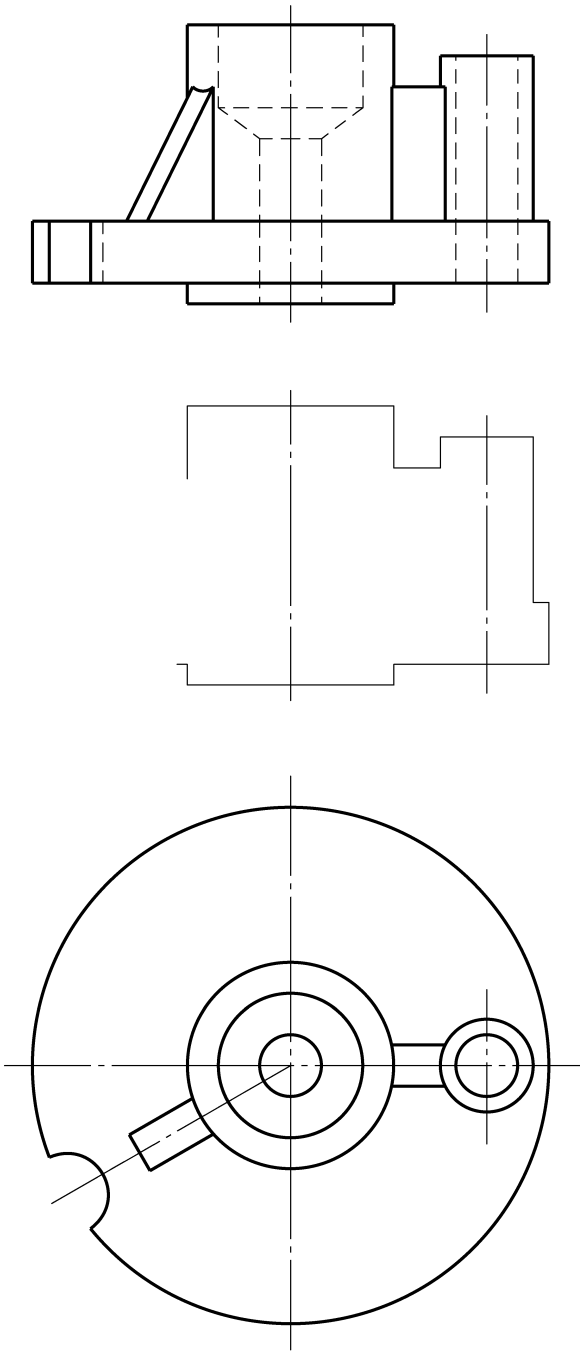


8. Draw the half sectional front view and draw a half sectional side view. 补画半剖主视图和半剖左视图。

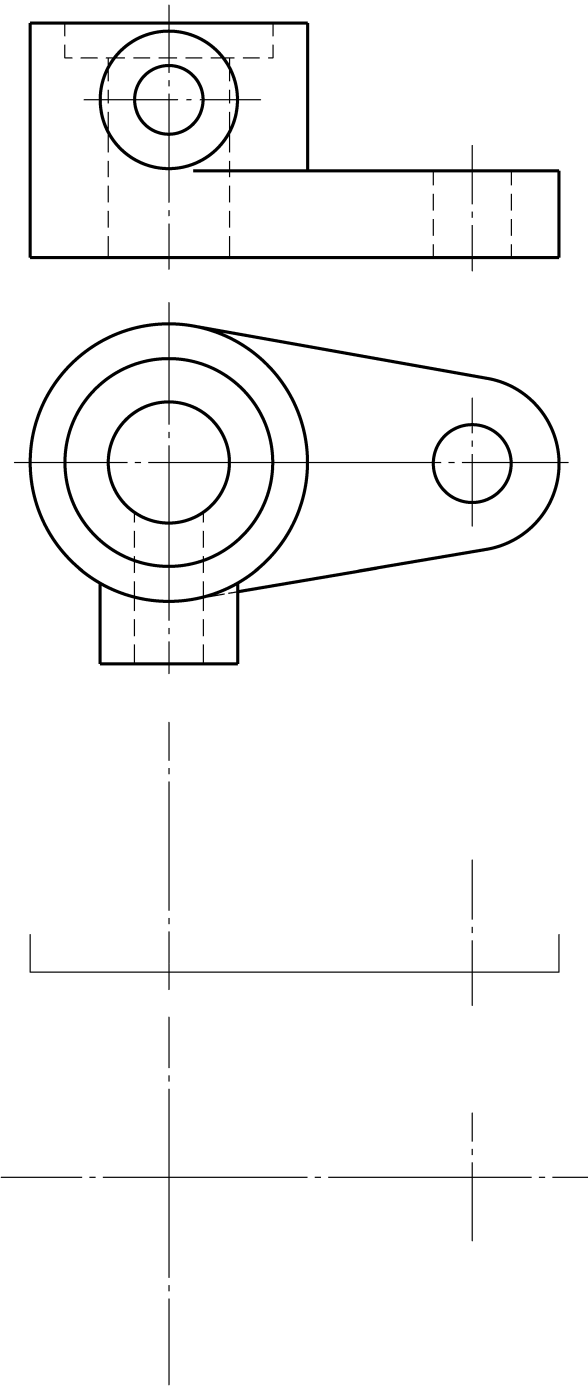


6-3 Sectional views 剖视图 (续)

9. Change the front view into a sectional view and complete the marks according to “GB” 把主视图画成剖视图，并按国标的规定补全标注。

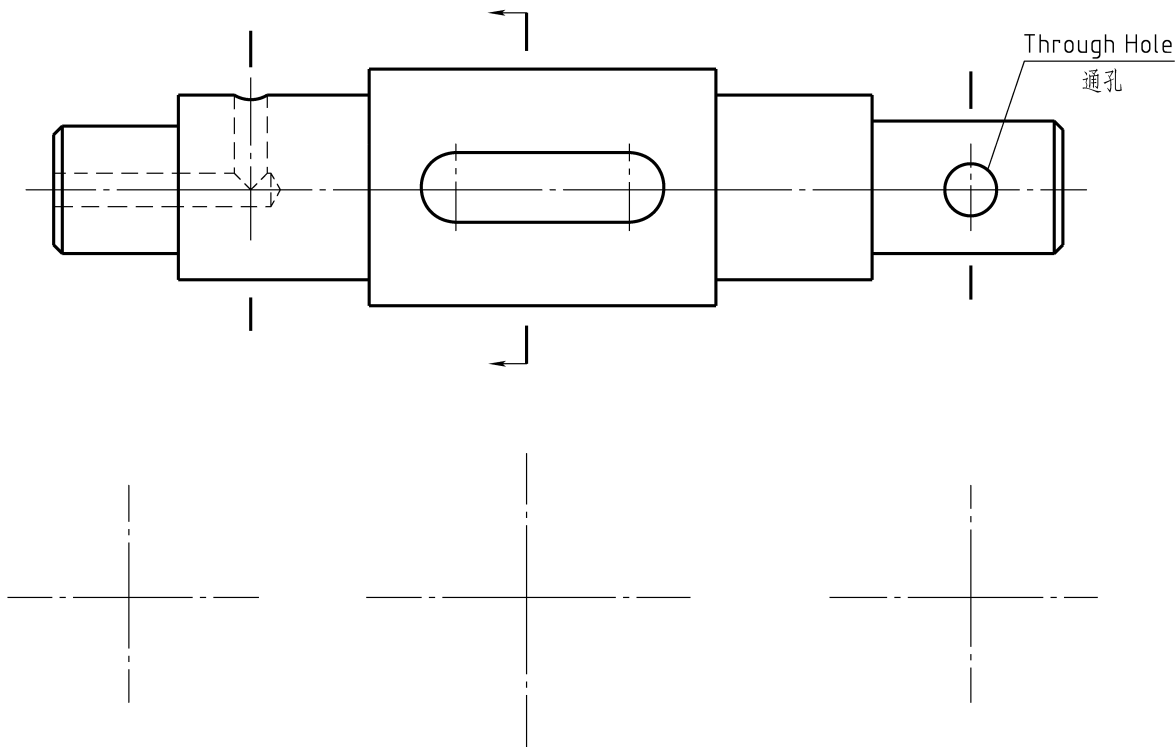


10. Change the front view and the top view into local sectional views. 将主视图和俯视图画成适当的局部剖视图。

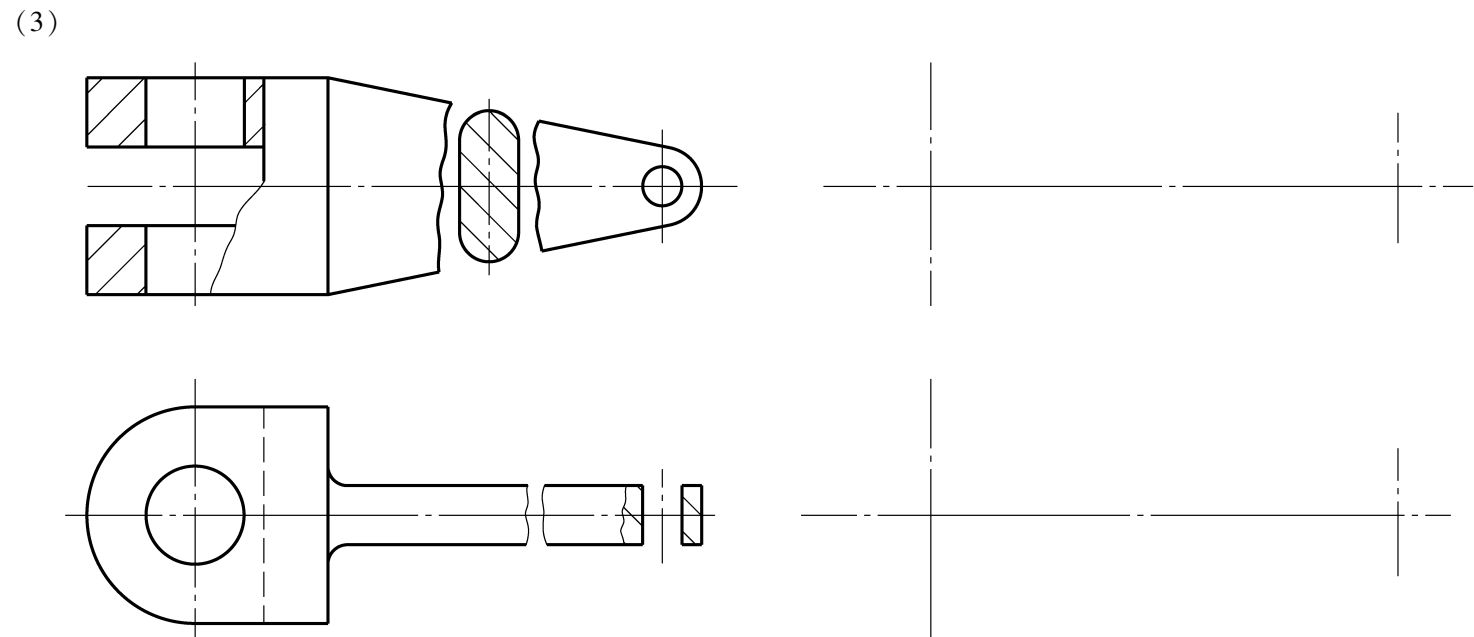
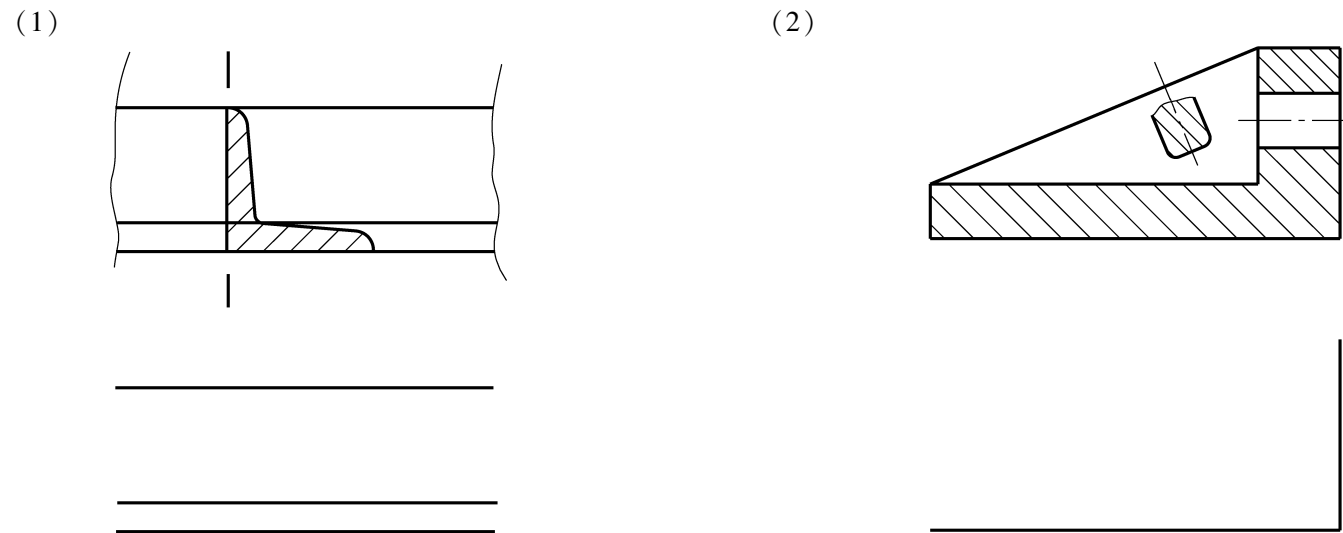


6-4 Cut views 断面图

1. Draw a cut view at the indicated position and complete the marks according to “GB” (depth of the key groove is 4mm) . 画出轴在指定位置的移出断面（键槽深 4mm），并按国标的规定补全标注。



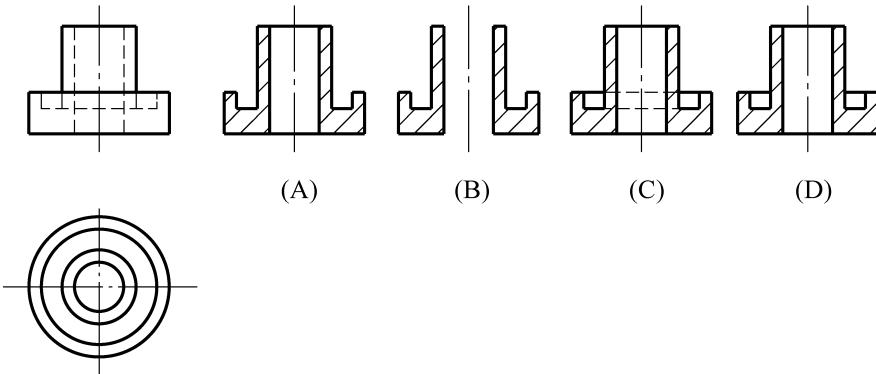
2. Point out errors and draw correct views. 指出错误并画出正确的图形。



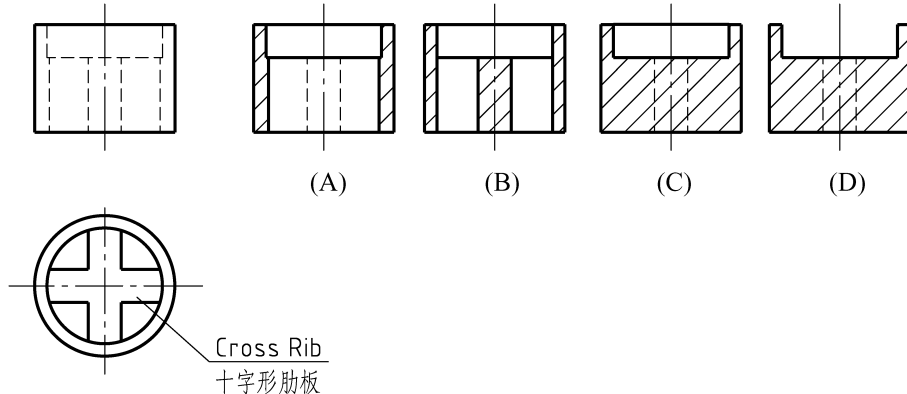
6-5 Choices 选择 (mark “✓” in the brackets)

1. Select the correct side view. 选择正确的左视图。()

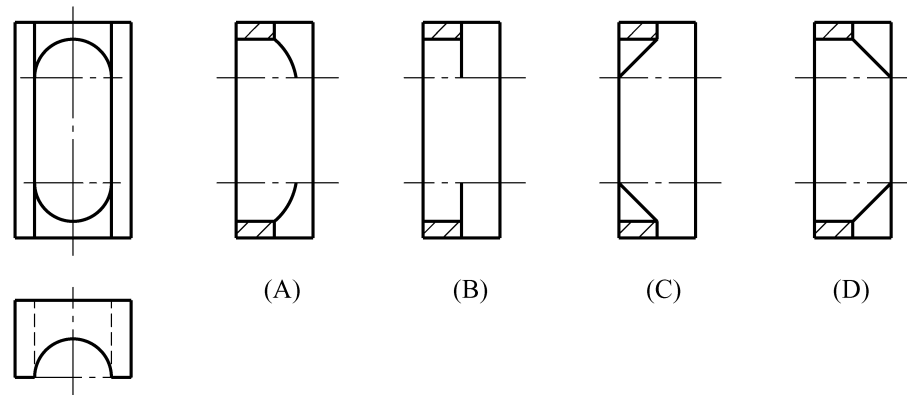
(1)



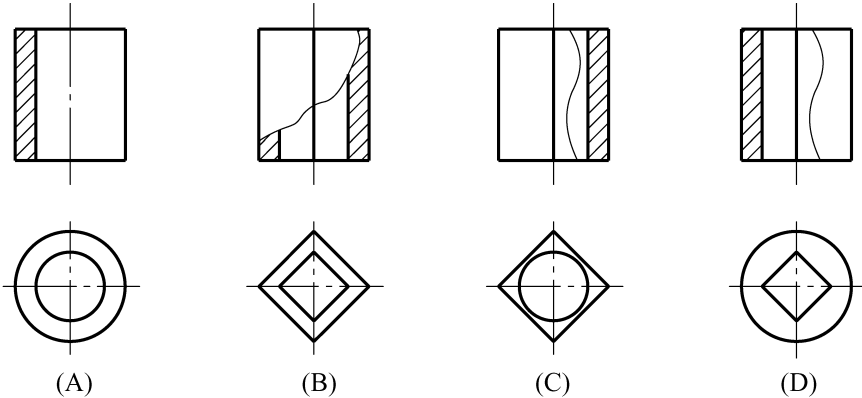
(2)



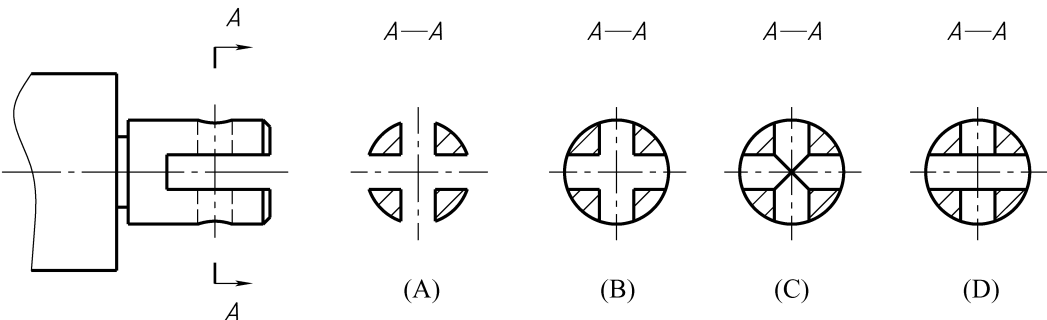
(3)



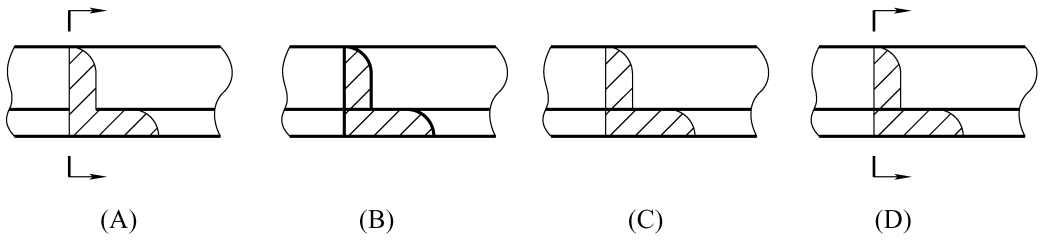
2. Select the correct group of sectional views. 选择正确的一组剖视图。()



3. Select the correct A—A removed cut view. 选择正确的 A—A 移出断面图。()



4. Select the correct superposed cut view. 选择正确的重合断面画法。()

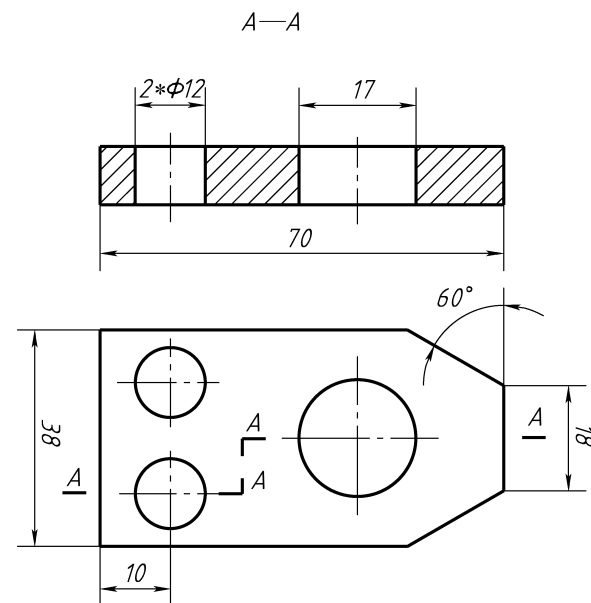


6-6 Dimensioning exercises 尺寸标注练习

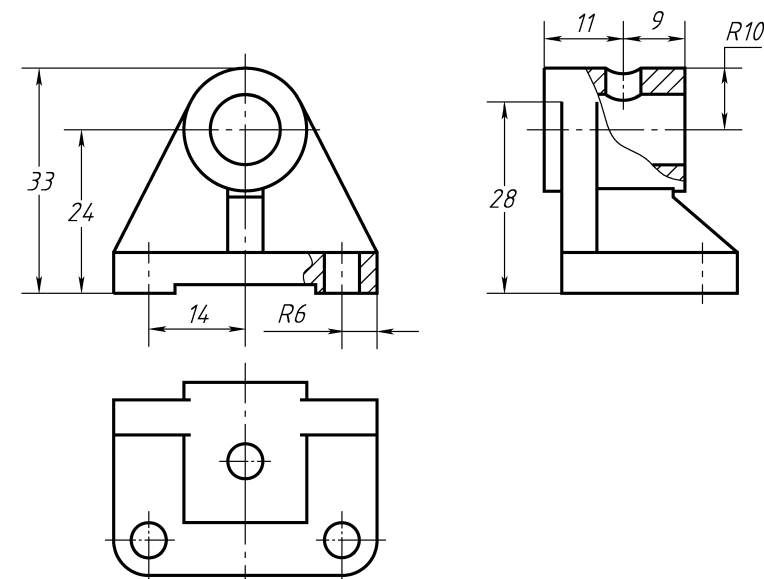
48

Check dimensions and then correct irrational marks, complete missing dimensions and delete redundant dimensions. 检查下列各题中的尺寸, 改正不合标准的注写方法, 补全漏注尺寸, 划掉多余尺寸。

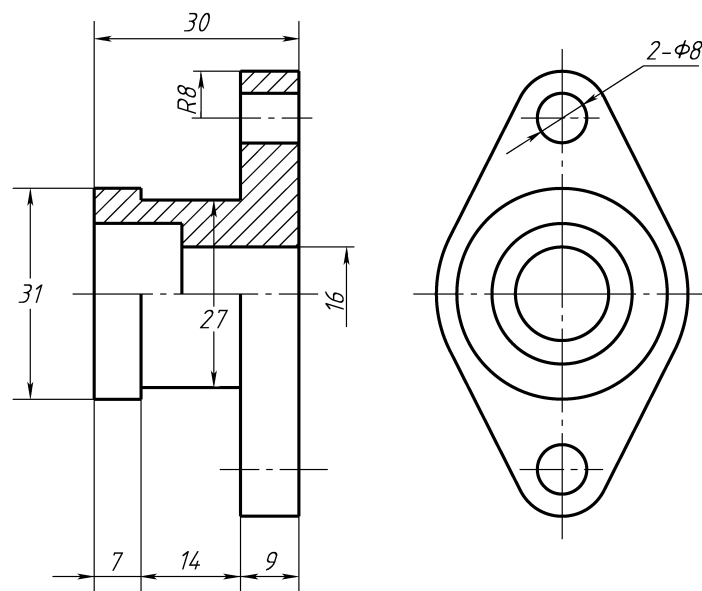
(1)



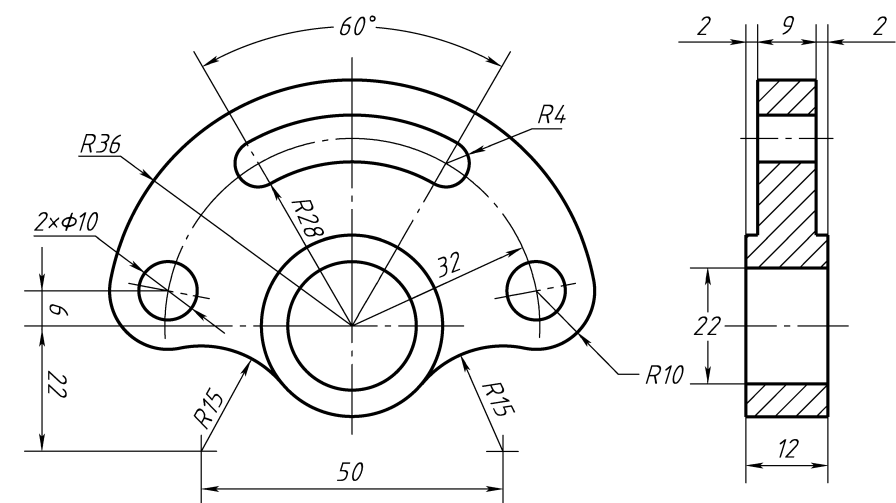
(2)



(3)



(4)



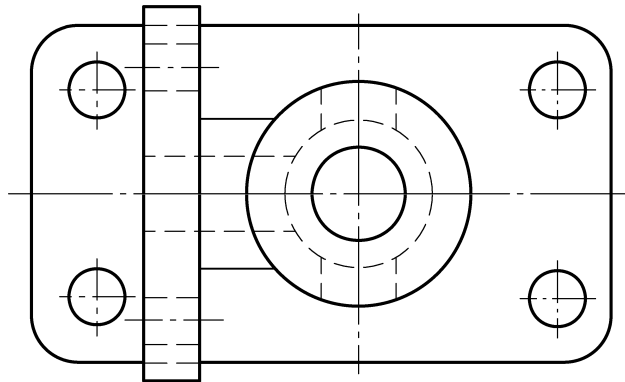
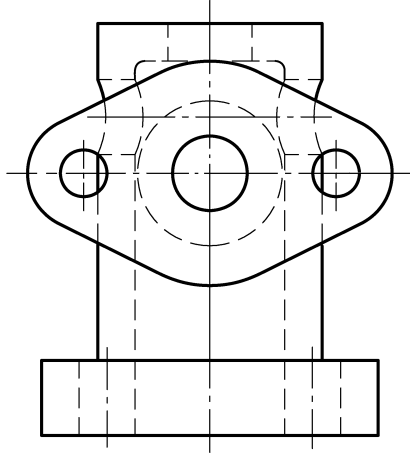
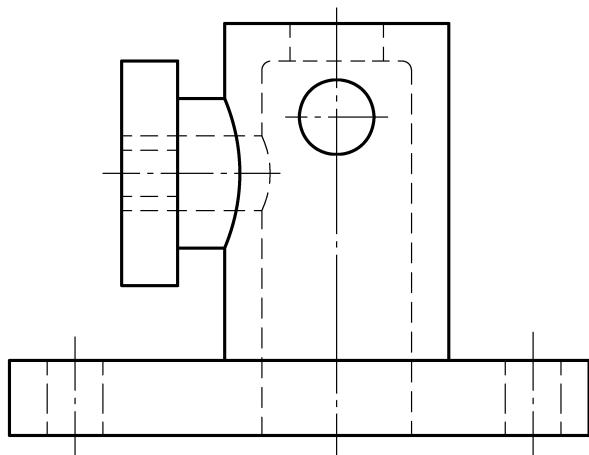
Class

Stu No.

Name

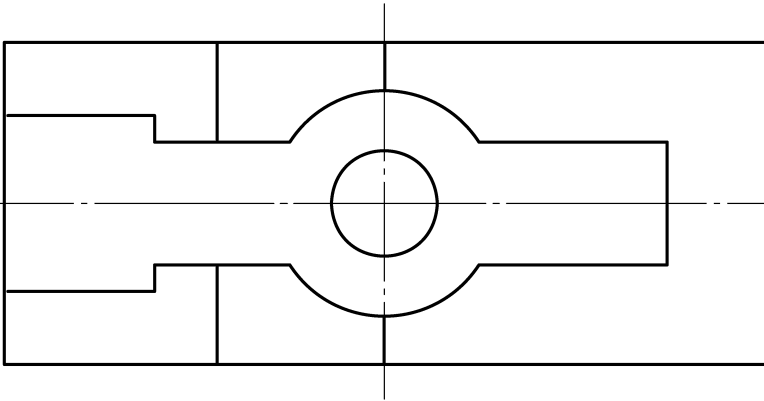
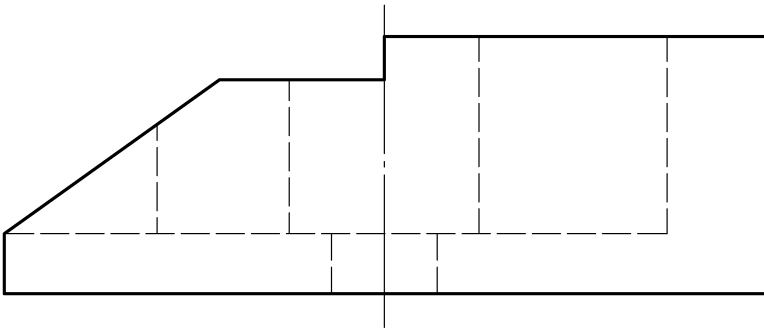
6-7 Comprehensive exercises 综合练习

1. Represent the internal and external structure of the part clearly with appropriate representation methods. 用合适的方案表达清楚零件的内外结构。



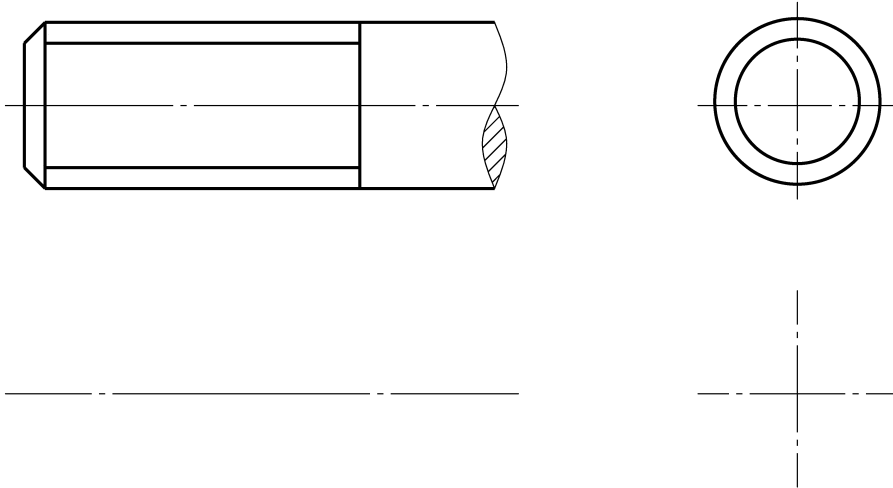
6-7 Comprehensive exercises 综合练习 (续)

2. Represent the internal and external structure of the part clearly with appropriate representation methods and sketch the pictorial section view. 用合适的方案表达清楚零件，并徒手绘制轴测剖视图。

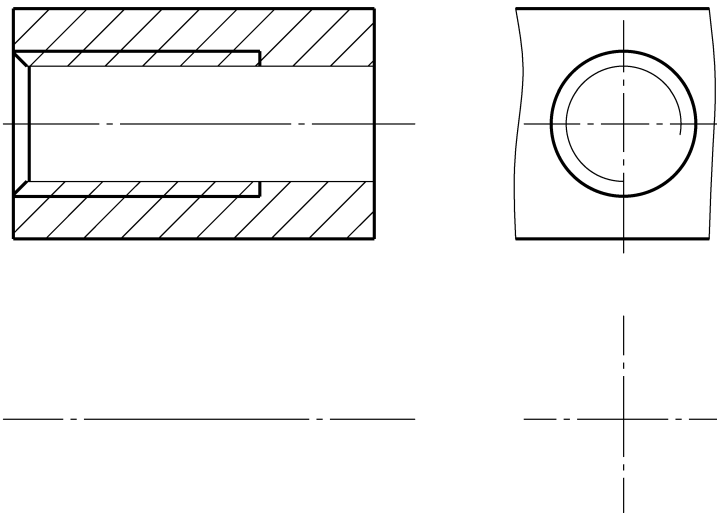


7-1 Specified representation of threads 螺纹的规定画法

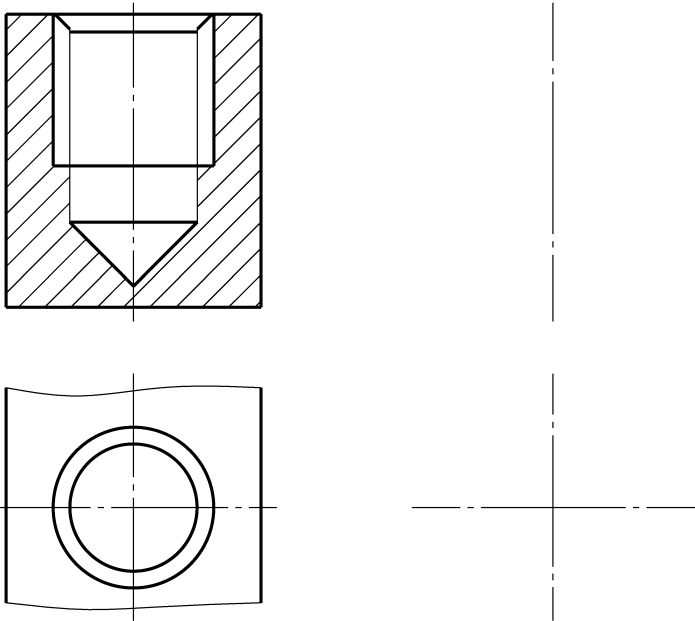
1. Point out errors of the external thread and draw correct one at the indicated position. 指出外螺纹的表达错误，在给定位置画出正确的视图。



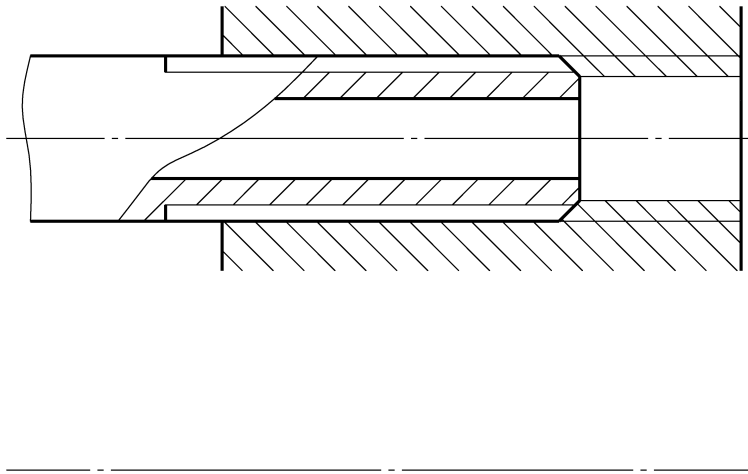
2. Point out errors of the internal thread and draw correct one at the indicated position. 指出内螺纹的表达错误，在给定位置画出正确的视图。

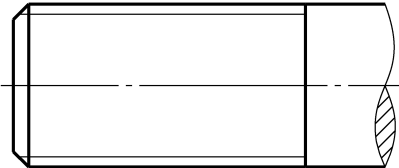
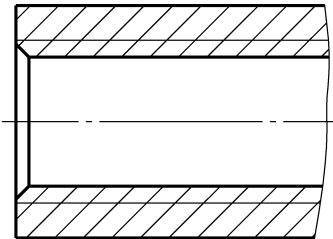
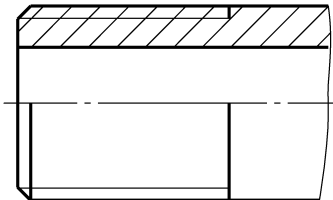
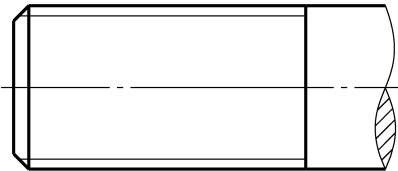
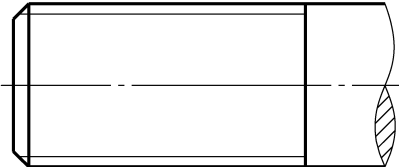
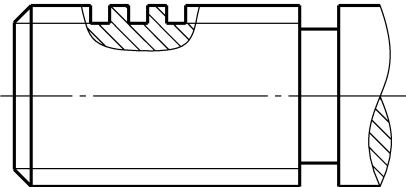


3. Point out errors of the internal thread and draw correct one at the indicated position. 指出内螺纹的表达错误，在给定位置画出正确的视图。



4. Point out errors of the internal and external thread joints (螺纹联接) and draw correct one at the indicated position. 指出螺纹联接中的表达错误，在给定位置画出正确的视图。

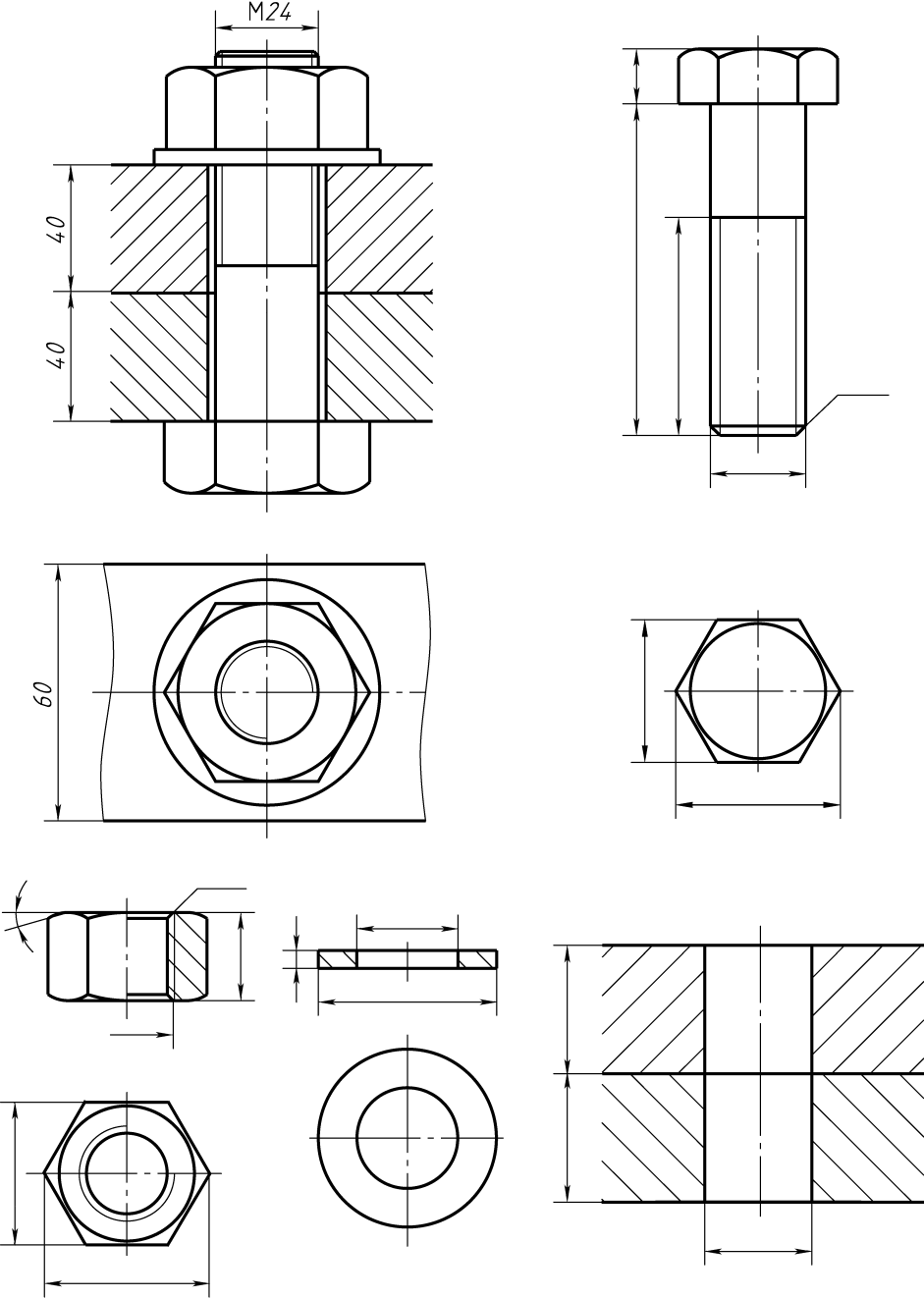


7-2 Thread marks 螺纹标注								52		
1. Metric thread of 20mm nominal diameter (公称直径), 2.5mm pitch, right – hand, 5g、6g tolerance zone symbol, short joint lenght. 普通螺纹，公称直径 20mm，螺距 2.5mm，右旋，中径、顶径的公差带代号 5g、6g，短旋合长度。 	2. Metric thread of 20mm nominal diameter, 1.5mm pitch, left – hand, 5H tolerance zone symbol. 普通螺纹，公称直径 20mm，螺距 1.5mm，左旋，中径和顶径公差带代号 5H。 	3. Non – screw – seal pipe thread of size symbol 1/2 and left – hand, tolerance class A. 55° 非密封管螺纹，尺寸代号 1/2，左旋，精度等级 A 级。 Major diameter of pipe thread (管螺纹的实际大径) is _____. 			4. Buttress thread of 60mm nominal diameter, 16 mm pitch, single – start, left – hand. 锯齿形螺纹公称直径 60mm，螺距 16mm，单线，左旋。 					
5. Trapezoidal thread of 36mm nominal diameter, 6mm pitch, double – start, right – hand. 梯形螺纹，公称直径 36mm，螺距 6mm，双线，右旋。 	6. Square thread of 24mm major diameter and 18mm minor diameter, 6mm pitch, 3mm thread ridge thickness, right – hand. 矩形螺纹，大径 24mm，小径 18mm，螺距 6mm，牙宽 3mm，右旋。 	7. Fill in the blank according to thread symbols. 已知螺纹代号，填表。								
		Thread Symbol 螺纹代号	Type of Thread 螺纹种类	Major Diameter 大径	Pitch 螺距	Lead 导程	Number of Thread 线数	Revolving Direction 旋向	Joint Length 旋合长度	Tolerance Zone Symbol (Class) 中径顶径公差带代号 (等级)
		M20—6H								
		M20 × 1. 5— 5g6g								
		M24 × 1. 5— 6g—LH								
		Tr60 × 16 (P8)								
		B60 × 32 (P8)								
		B40 × 14 (P7) LH								
G1/2A										

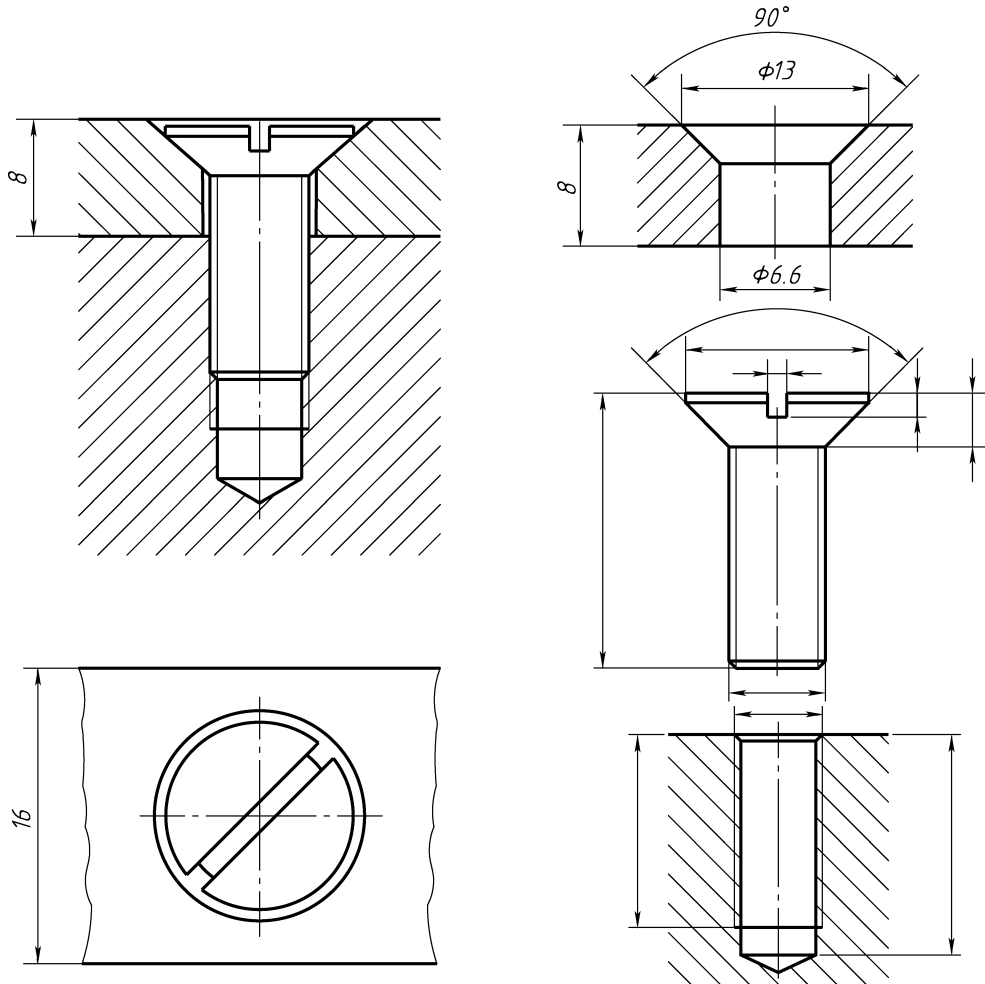
7-3 Screw fasteners 螺纹联接件

1. Looking - up table method. 查表画法。

(1) Draw assembly drawings of hex bolt (scale 1:1): Hex bolts M24 (GB/T 5782—2016), sizes of linked parts shown in the following figures, materials for Q235, medium assembly precision. 画螺栓联接装配图 (比例 1:1): 六角头螺栓 M24 (GB/T 5782—2016), 被联接件尺寸如图所示, 材料为 Q235, 中等装配精度。



(2) Draw assembly drawings of screw (scale 5:1): screws M6 (GB/T 68—2016), sizes of linked parts shown in the following figures, materials for cast iron, medium assembly precision. 画螺钉联接装配图 (比例 5:1): 螺钉 M6 (GB/T 68—2016), 被联接件尺寸如图所示, 材料为铸铁, 中等装配精度。



2. Proportional drawing method. 比例画法。

(1) Draw an assembly with A4 sheet using a M6 countersunk head screw, one component with 8mm thickness, the other with 15mm width and material for cast iron (Scale 5:1). 已知一个被联接件厚度 8mm, 另一个被联接件材料为铸铁, 宽度 15mm; 沉头螺钉 M6, 用 A4 图纸画螺钉联接 (比例 5:1)。

(2) Draw an assembly with A4 sheet using a M24 bolt, one component with 40mm thickness, the other with 40mm thickness and 60mm width is 60mm (Scale 1:1).

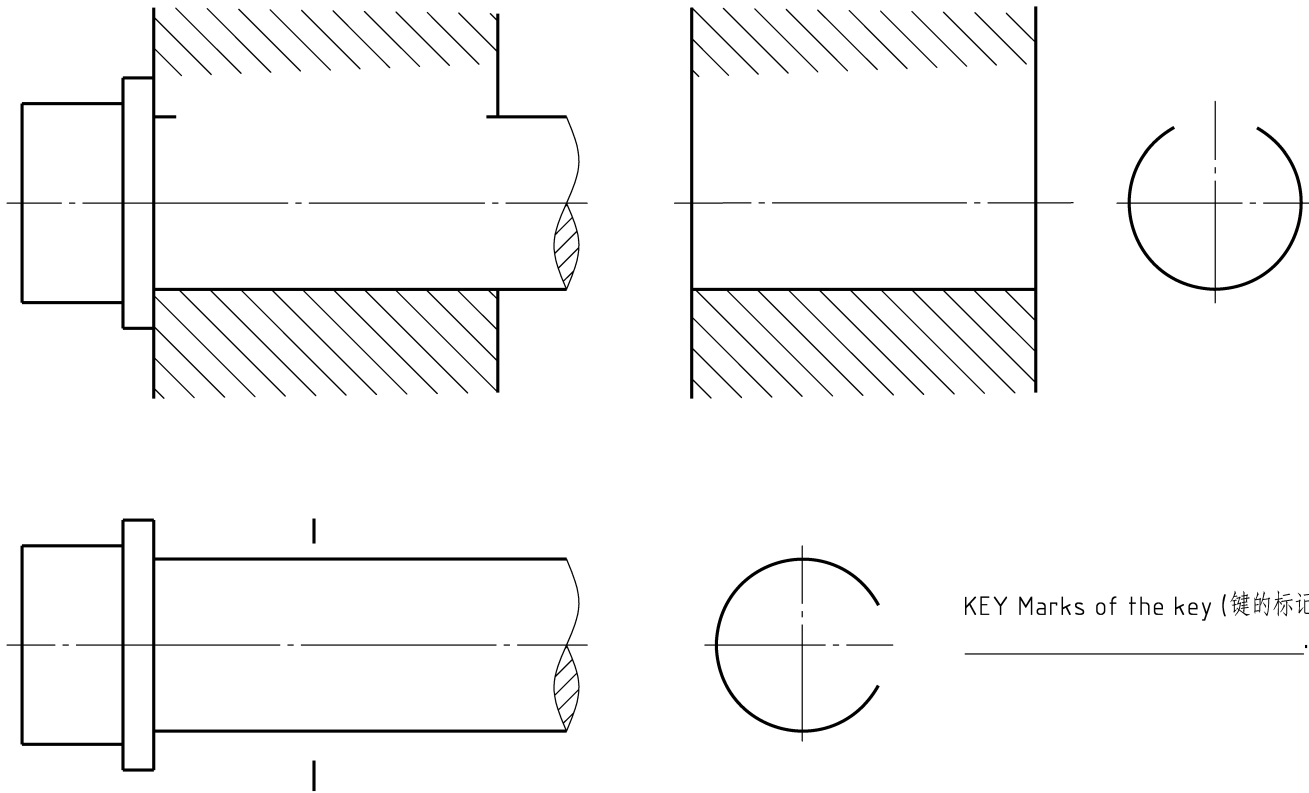
已知一个被联接件厚度 40mm, 另一个被联接件厚度 40mm, 宽度 60mm; 螺栓公称直径 M24, 用 A4 画螺栓联接 (比例 1:1)。

7-4 Key joints and gears 键联结和齿轮

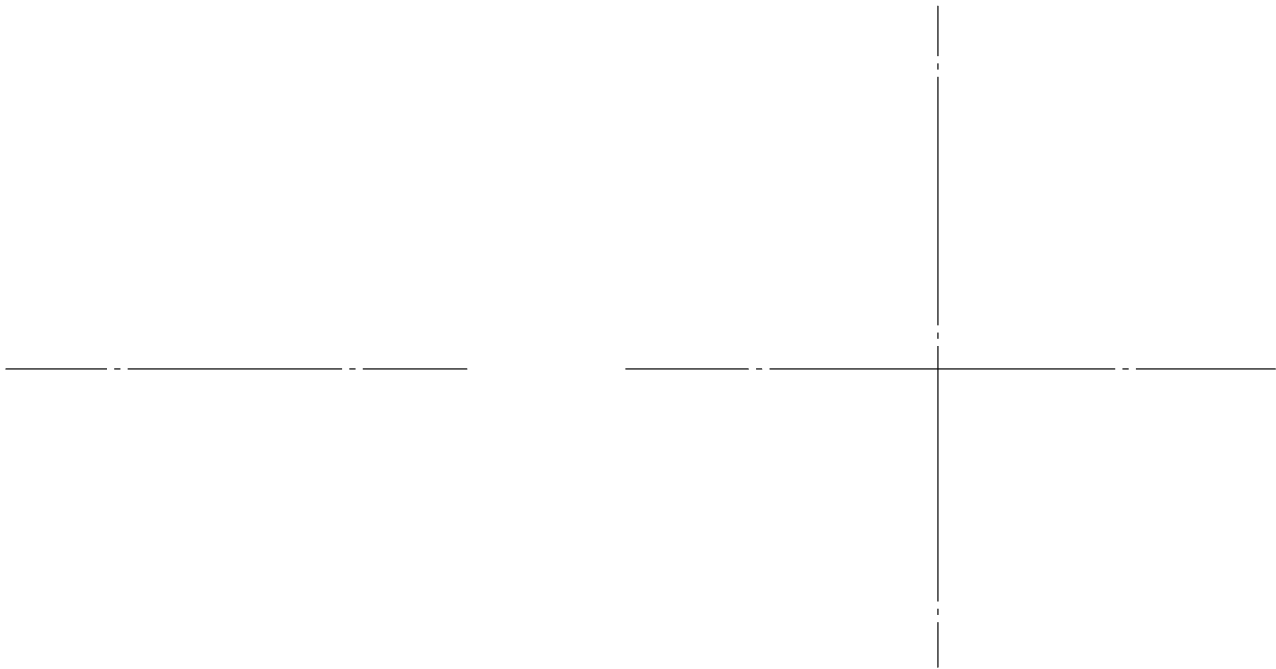
1. Design key joints given that 25mm diameter of shaft and 50mm length of hub. 已知：轴直径为 25mm，轮毂长 50mm，设计键联结。

(1) Select length of the key and mark it, draw the keyways of key and hub, then dimension. 选定键的长度并写出键的标记，画出轴和轮毂上的键槽，标注尺寸。

(2) Complete the assembly drawing of key joints. 补全键联结装配图。



2. Draw the front view and the side view of gear and dimension (solid spur gear with keyway, module 3mm, number of teeth 25, tooth width 30mm, scale 1:1). 已知：实心式圆柱齿轮，轮齿模数 $m = 3\text{mm}$ ，齿数 $z = 25$ ，齿宽 $b = 30\text{mm}$ ，并制有普通平键轴孔，孔径 $D = 25\text{mm}$ ，1:1 画出齿轮的主、左视图，并标注尺寸。

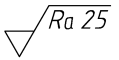
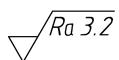


7-4 Key joints and gears 键联结和齿轮 （续）	55
---	----

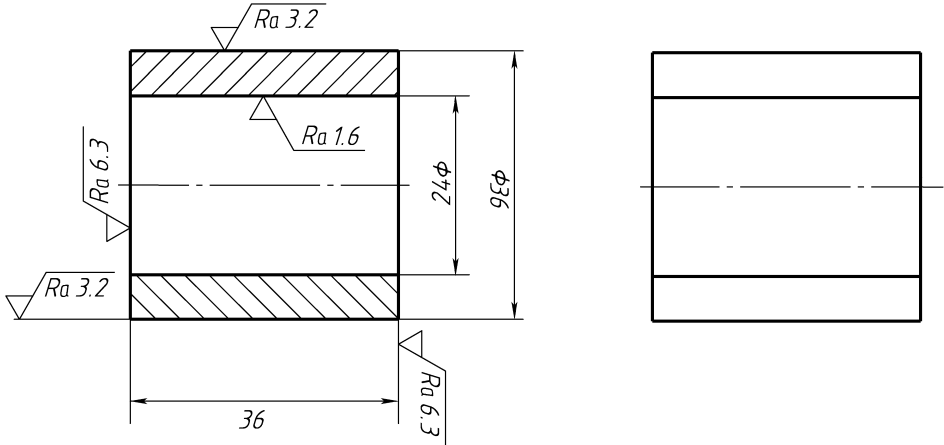
3. Draw meshing gears and dimension the center distance. （two solid spur gears with keyway, module 3mm, $Z_1 = 21$, $Z_2 = 22$, tooth width 20mm, diameter of hole 20mm and diameter of shaft 25mm, scale 1:1）. 已知：两实心式圆柱齿轮，轮齿模数 $m = 3\text{mm}$ ，齿数 $z_1 = 21$ ，齿数 $z_2 = 28$ ，齿宽 $b = 20\text{mm}$ ，并制有普通平键轴孔，孔径 $D_1 = 20\text{mm}$ ，轴径 $D_2 = 25\text{mm}$ ，1:1 画出两齿轮的啮合图，并标注中心距。

8-1 Surface texture 表面结构

1. Answer questions. 回答问题。

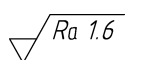
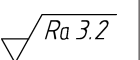
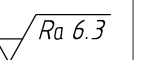
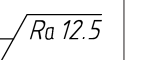
-  represents(仪表) _____
-  represents(仪表) _____
-  represents(仪表) _____
-  represents(仪表) _____
-  represents(仪表) _____

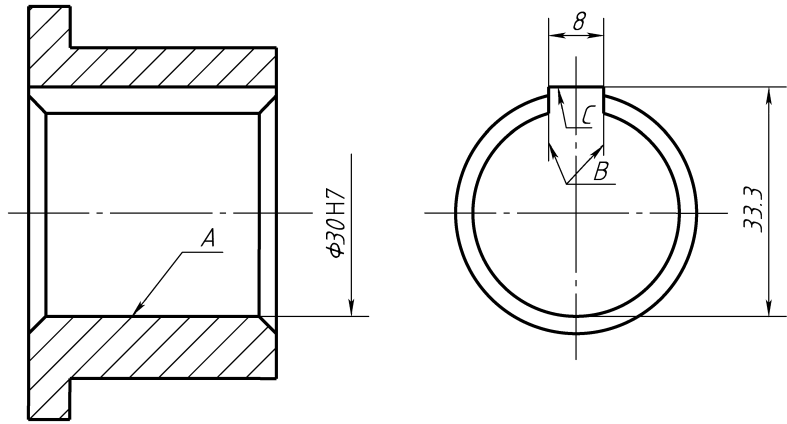
2. Check carefully and draw the correct specification at the right. 仔细查看图中的错误，将正确的画在右面。



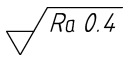
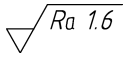
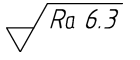
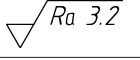
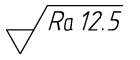
3. Specify surface textures on the following drawings according to the table. 将表中各表面结构要求标注在下图中。

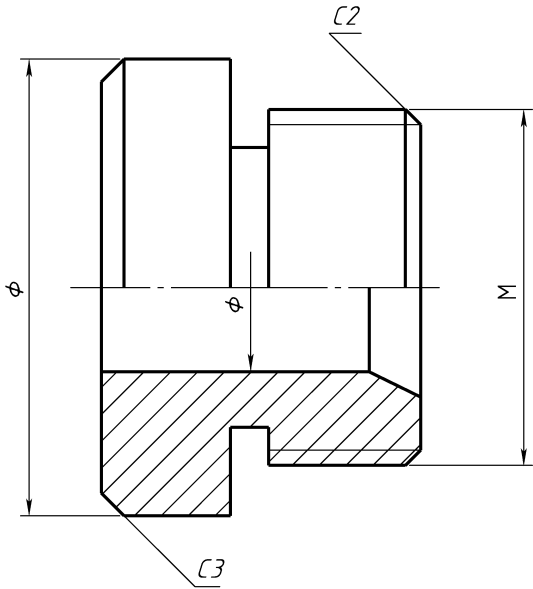
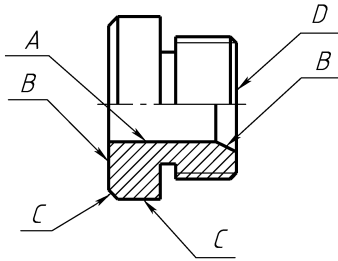
(1)

Surface 表面	A	B	C	The Rest 其余表面
Surface Texture 表面粗糙度				



(2)

Surface 表面	Surface Texture 表面粗糙度
A	
B	
C	
D	
The Rest 其余表面	



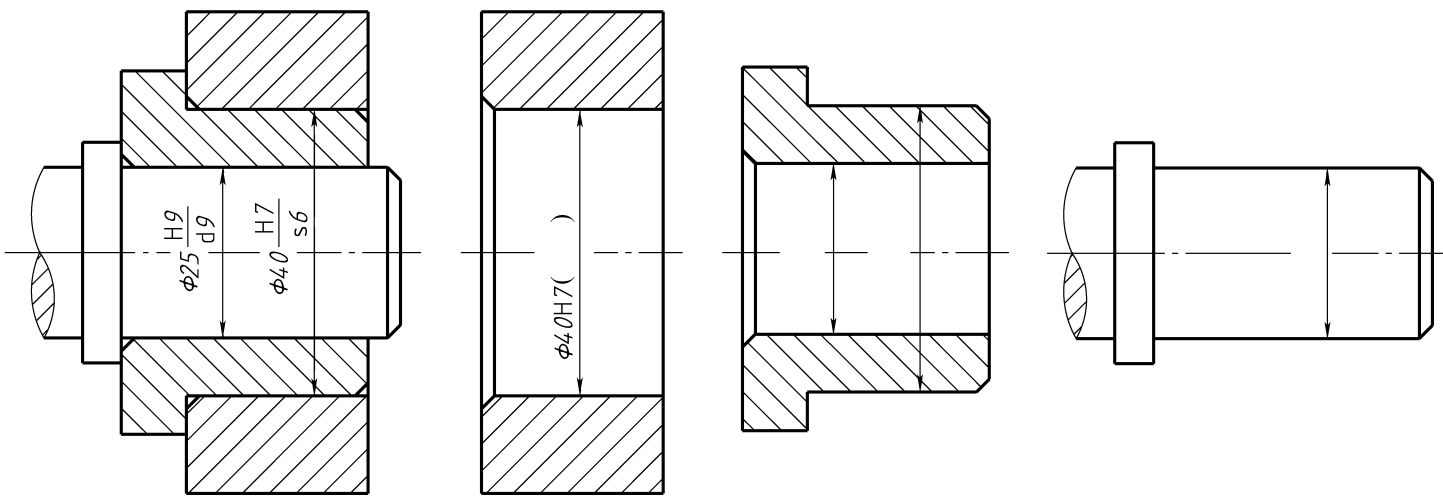
Class

Stu No.

Name

8-2 Limits and fits 极限与偏差

1. Lable nominal sizes and deviation on detail drawings according to fit codes of the following assembly drawing. 根据装配图上的配合代号分别在零件图上注出公称尺寸及其极限偏差值。



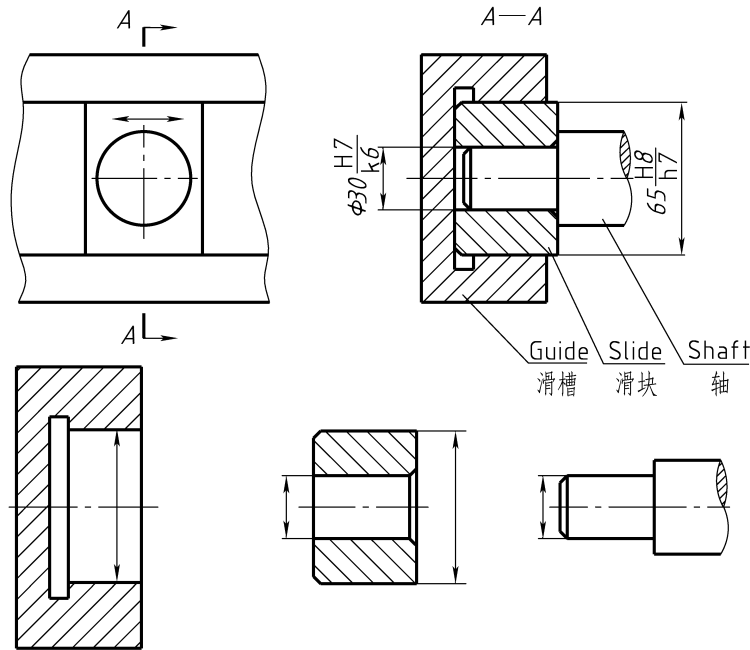
2. Fill the table and draw tolerance zone diagram. 填表并画出公差带图。



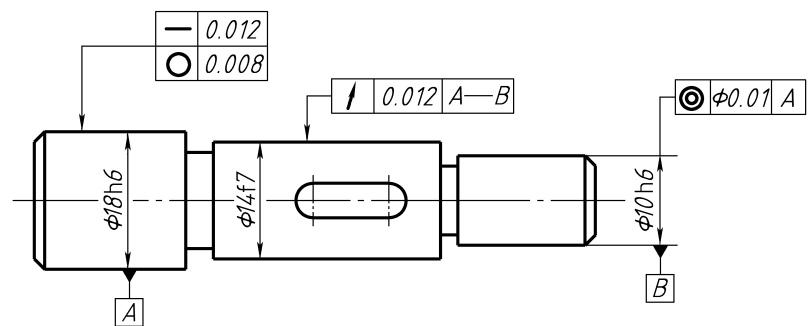
Choice 选择 (mark “√” in the brackets)	$\phi 25 \frac{H9}{d9}$ Hole basis system 基孔制()/Shaft basis system 基轴制() Clearance fit 间隙配合()/Transition fit 过渡配合()/Interference fit 过盈配合()		$\phi 40 \frac{H7}{s6}$ Hole basis system 基孔制()/Shaft basis system 基轴制() Clearance fit 间隙配合()/Transition fit 过渡配合()/Interference fit 过盈配合()	
	Hole	shaft	Hole	shaft
公称尺寸 Nominal size	$\phi 25$			
上极限尺寸 Upper limit size				
下极限尺寸 Lower limit size				
上极限偏差 Upper limit deviation	+0.052			
下极限偏差 Lower limit deviation	0			
公差 Tolerance				
最大 (间隙) Maximum (clearance)				
最小 (间隙) Minimum (clearance)				
最大 (过盈) Maximum (interference)				
最小 (过盈) Minimum (interference)				

8-3 Labeling 标注

1. Label nominal sizes and deviation on detail drawings. 在零件图上注出公称尺寸及其极限偏差值。



2. Indicate the meaning of geometrical tolerance symbols. 用文字说明图中几何公差代号的含义。



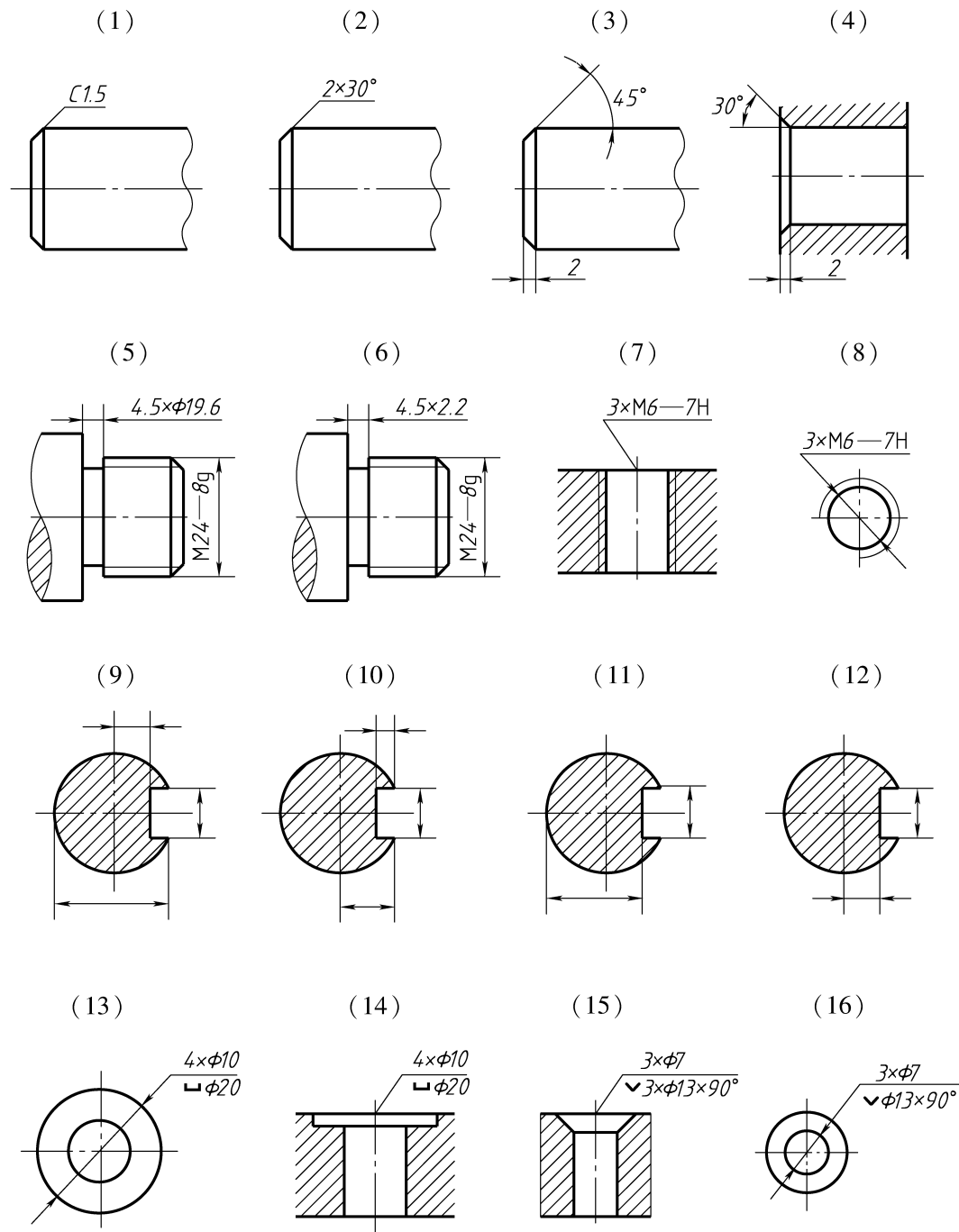
— 0.012 _____

○ 0.008 _____

⊙ $\phi 0.01$ A _____

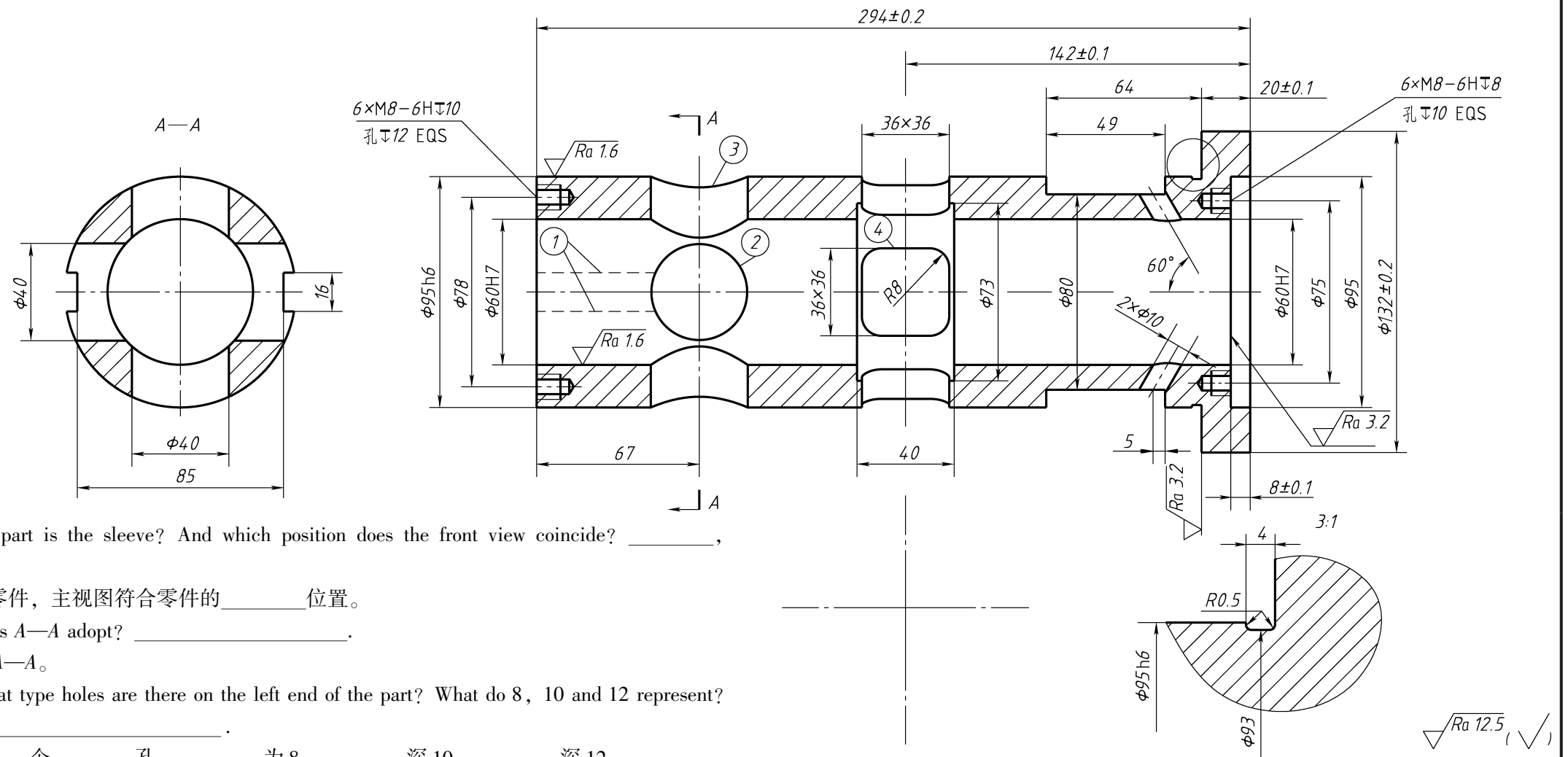
⌈ 0.012 A—B _____

3. State corrects (mark “√”) and errors (mark “×”) of the following construction size. 指出下列结构尺寸标注的正误。



8-4 Read detail drawings 读零件图

1. Sleeve 套筒



(1) What type of the part is the sleeve? And which position does the front view coincide? _____,

该零件为_____类零件，主视图符合零件的_____位置。

(2) Which method does A—A adopt? _____.

采用_____图表示 A—A。

(3) How many and what type holes are there on the left end of the part? What do 8, 10 and 12 represent?

该零件左端面有_____个_____孔，_____为8、_____深10、_____深12。

(4) What method does the surface roughness of $\phi 95\text{h6}$ cylindrical face gain? What is the upper limit of Ra ?

φ95h6 圆柱面的表面粗糙度用_____材料的方法获得, Ra 的上限值为_____。

(5) Write the limit deviation: $\phi 95h6$ (), $\phi 60H7$ ()。

查表确定极限偏差： $\phi 95h6$ ()、 $\phi 60H7$ ()。

(6) What are the maximum size, the minimum size and the tolerance of the size $\phi 132 \pm 0.2$?

外圆柱面 $\phi 132 \pm 0.2$ 最大可加工成_____，最小可为_____，公差为_____。

(7) What is the distance between the two dash lines at the position ①? _____.

图中标有①的部位，所指两条虚线的距离为_____。

(8) What is the diameter of the position②? What is the upper limit of Ra ? _____.
图中标有②的直径为_____, 表面粗糙度 Ra 的上限值为_____。

(9) How does the curve line③ form? And what is the line? _____.

图中标有③的曲线是_____与_____相交形成的_____。

(10) What are the shape size and the location size of line frame ④?

图中标有④的线框，其定形尺寸是_____，定位尺寸是_____。

(11) Point out the main datum of radial size and axial size by “ Δ ”, and draw a removal sectional view at the indicated position.

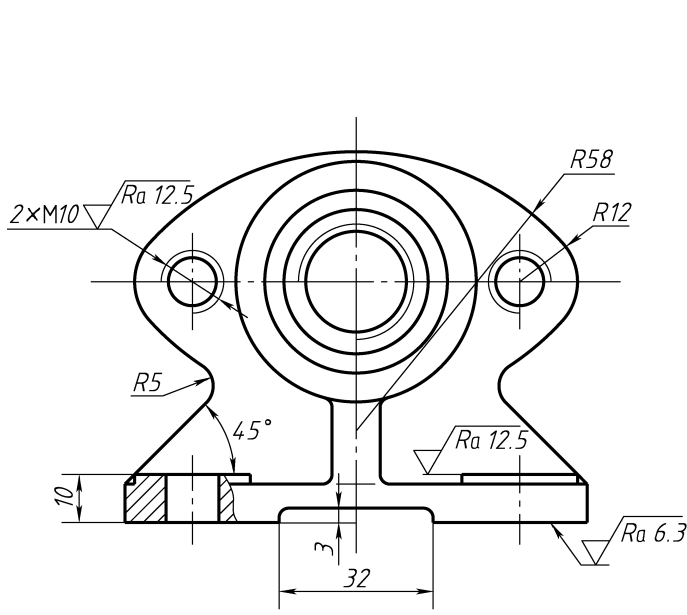
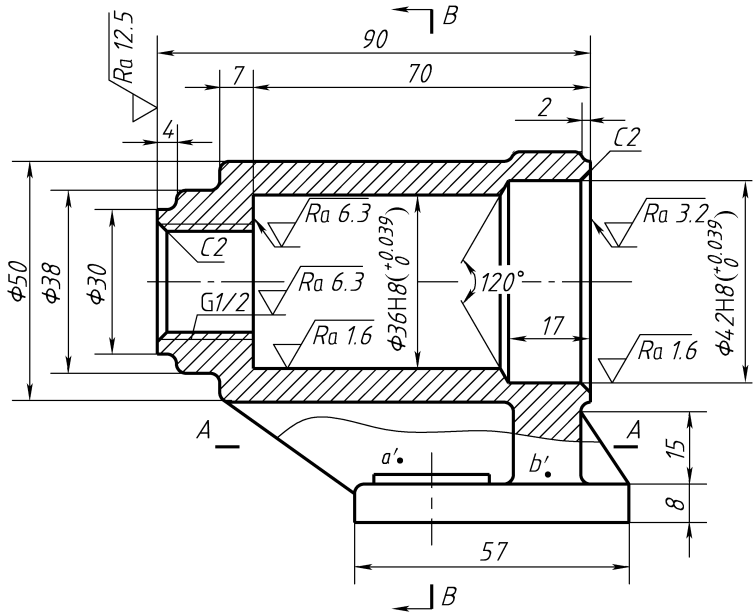
用“△”指出径向和轴向尺寸的主要基准，并在指定位置画出移出断面图。

Class

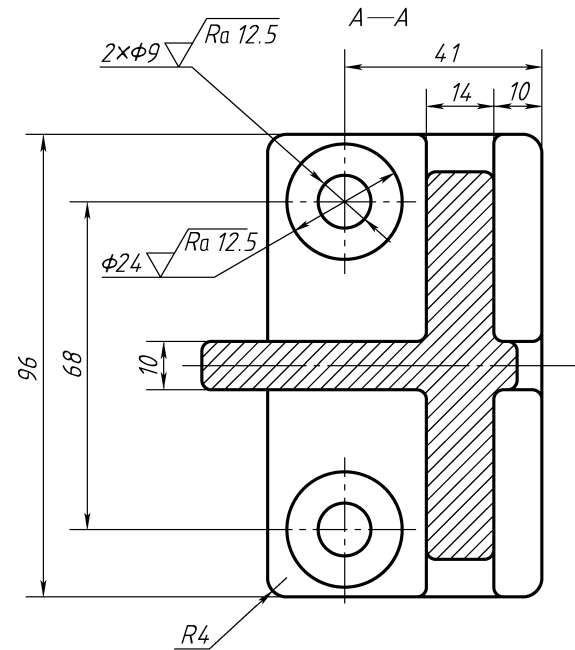
Stu No.

Name

2. Pump 泵体



B—B



TECHNICAL REQUEST 技术要求
1.No sand hole and pore for cast part.
铸件不得有砂眼、气孔。
2.Unspecified fillet radii R2.
未注圆角R2。

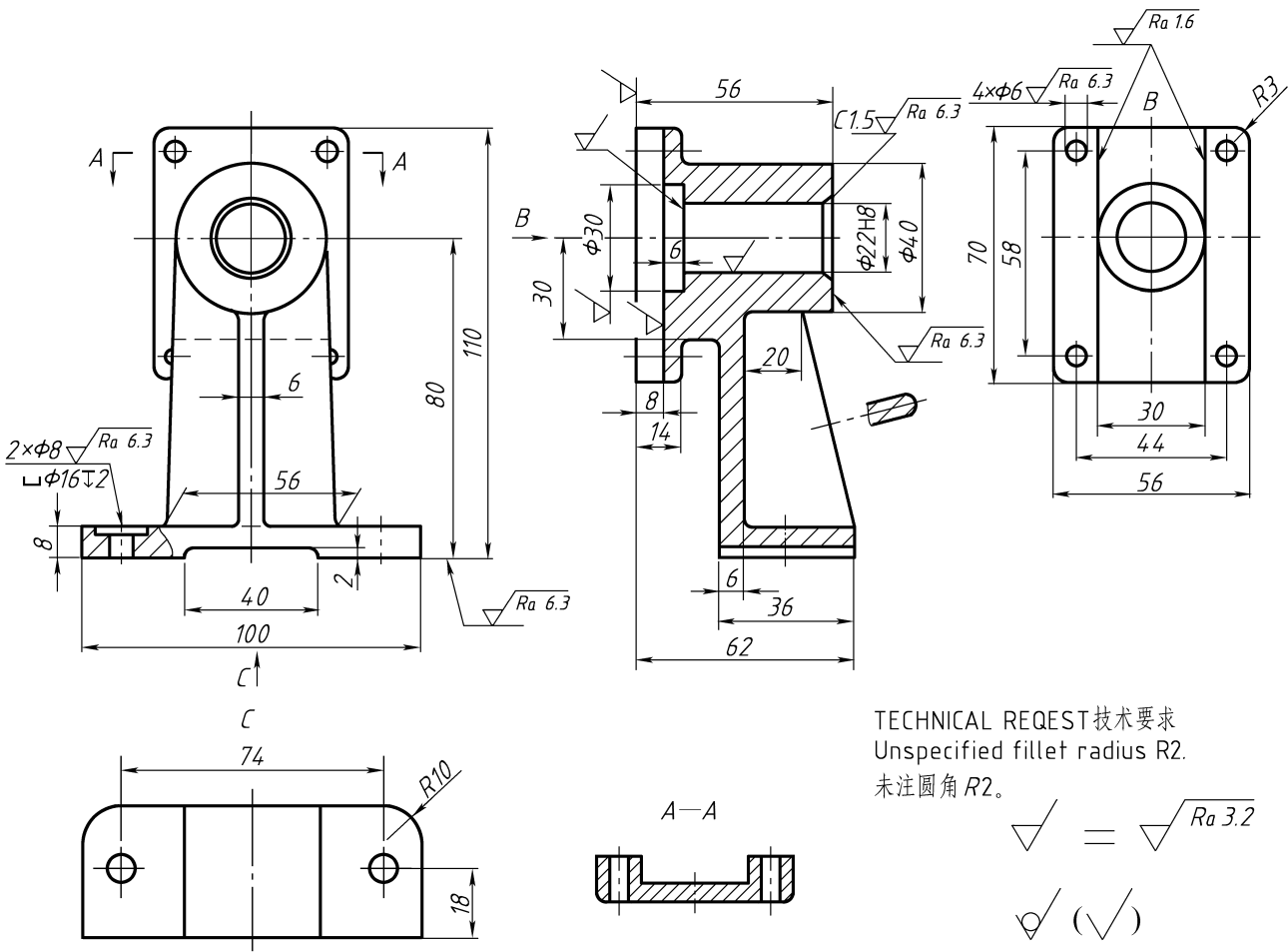


- (1) Which method does the front view adopt? _____.
主视图采用_____表达方法。
- (2) Find out two location sizes and two shape sizes from the top view. _____.
在俯视图中找出两个定位尺寸_____和两个定形尺寸_____。
- (3) What type of thread and what major diameter does the left marker G1/2? _____.
零件左端螺纹标注 G1/2 是表示_____螺纹，大径为_____。
- (4) What does C2 represent? _____.
图中 C2 表示_____。
- (5) Complete missing location sizes in the details drawing.
补注出零件图中所缺的定位尺寸。
- (6) Draw the horizontal and side projection of point A, B (reserve projecting process).
已知零件表面上 A、B 点的正面投影 a'、b'，求出它们的水平投影和侧面投影（保留作图的投影连线）。
- (7) Draw a B—B sectional view at the indicated position. 在指定位置画出 B—B 剖视图。

8-5 Freehand drawing axonometric projection 徒手绘制轴测图

Requirements 要求

- (1) Drawing with A3 sheet, scale 1:1. 用 A3 图纸, 比例 1:1。
(2) Freehand drawing isometric projection (正等测), no tools drawing. 徒手绘制正等测图。
(3) Only drawing external construction, no sectional view. 只需表达外部结构, 不用表达内部结构。



轴承座			比例	1:2		
			数量	1		
制图			重量		材料	HT200
描图						
审核						

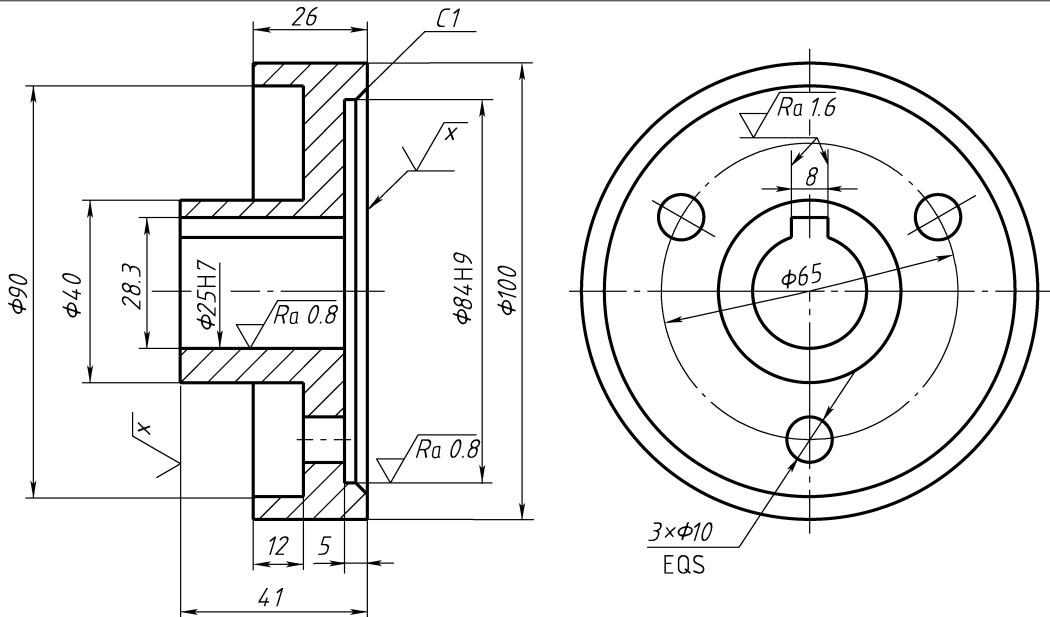
Class

Stu No.

Name

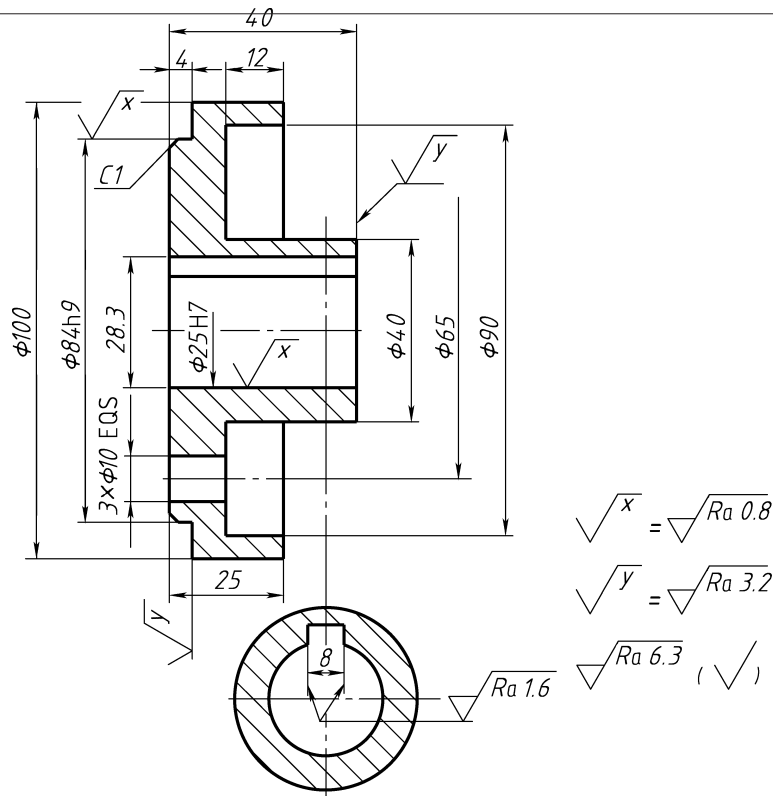
9-1 Complete assembly drawings 画装配图

1. Draw an assembly drawing of coupling A2 sheet (scale 2:1). 用 A2 图纸拼画联轴器装配图 (比例 2:1)。



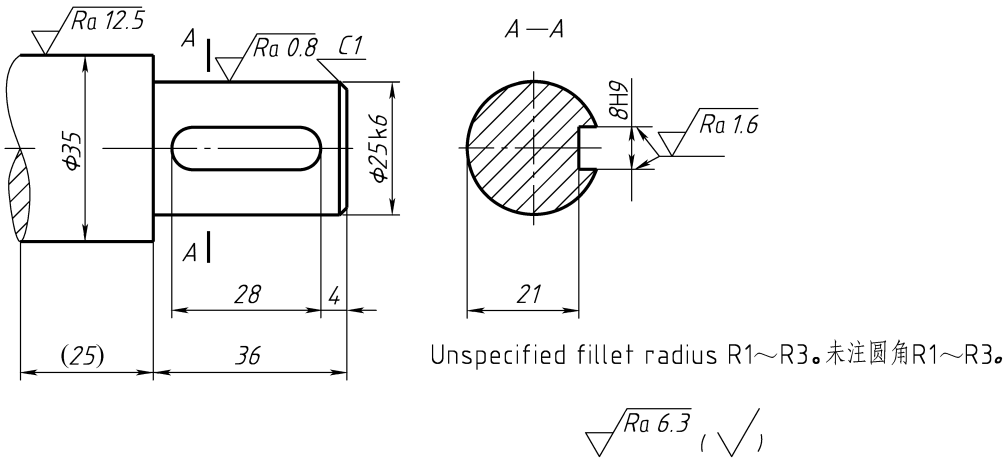
All sharp edges abate. 零件所有锐边倒钝。

Left half coupler Q235 A 1No. off



All sharp edges abate. 零件所有锐边倒钝。

Right half coupler Q235 A 1No. off



Unspecified fillet radius $R1 \sim R3$. 未注圆角 $R1 \sim R3$ 。

Shaft 45 2No. off

Standard Parts 标准件

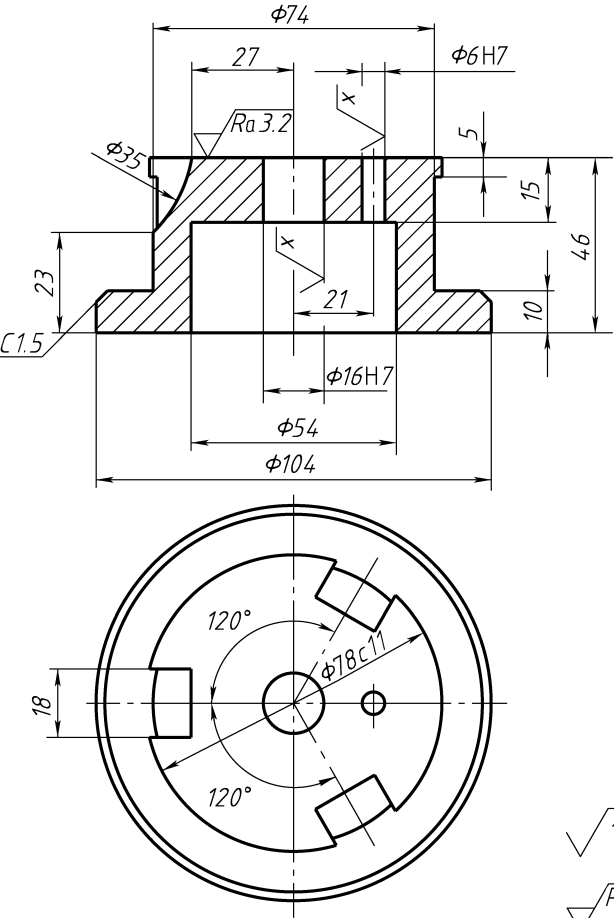
1. Hexagon Head Bolt 六角头螺栓规定标记为: 螺栓 GB/T 5782—2016 M8 × 35, 数量为 3。
2. Hexagon Nut 1 型六角螺母规定标记为: 螺母 GB/T 6170—2015 M8, 数量为 3。
3. Square and Rectangular Key (Style A) 圆头普通平键规定标记为: GB/T 1096—2003 键 8 × 7 × 28, 数量为 2。
4. Plain Washer 平垫圈规定标记为: 垫圈 GB/T 97.1—2002 8, 数量为 3。

Chapter 9 Assembly Drawings 装配图

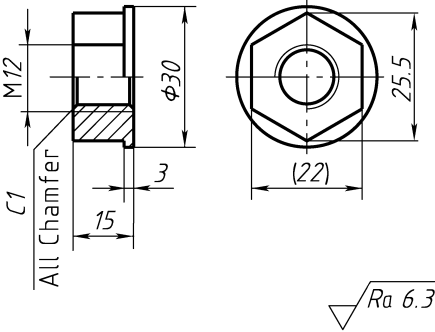
9-1 Complete assembly drawings 画装配图 (续)

63

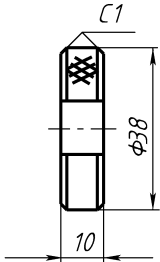
2. Draw an assembly drawing of drill jig on A2 sheet (scale 2:1). 用 A2 图纸拼画钻模装配图 (比例 2:1)。



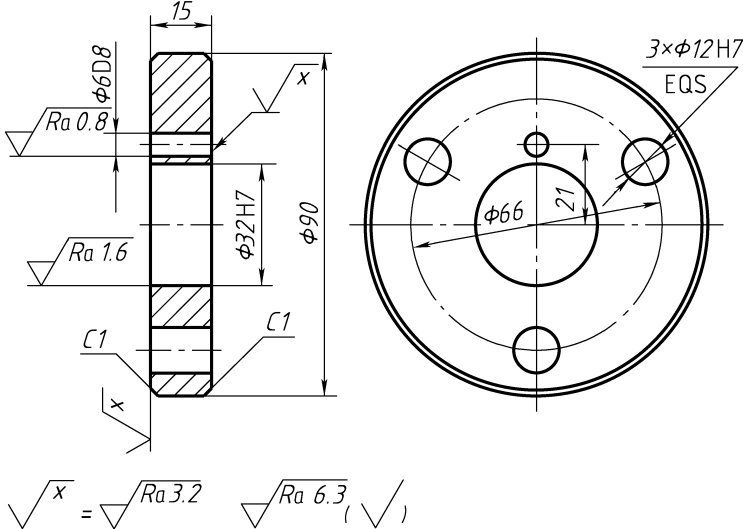
Base HT150 1 No. off



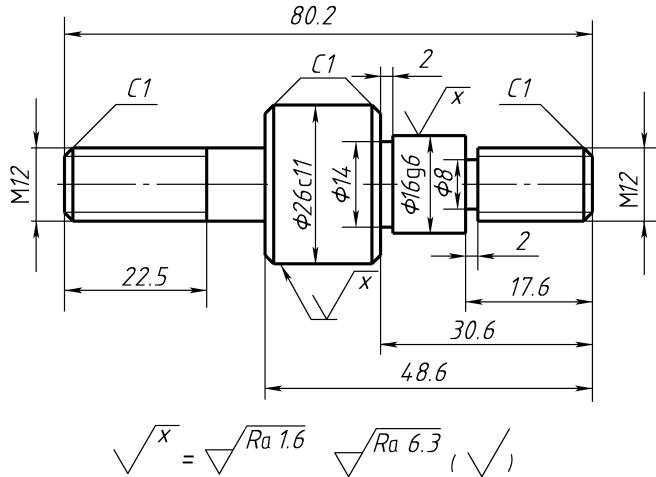
Nut 35 1 No. off



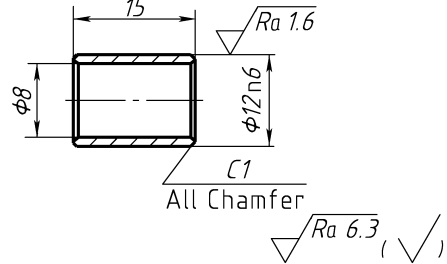
Slotted washer 35 1 No. off



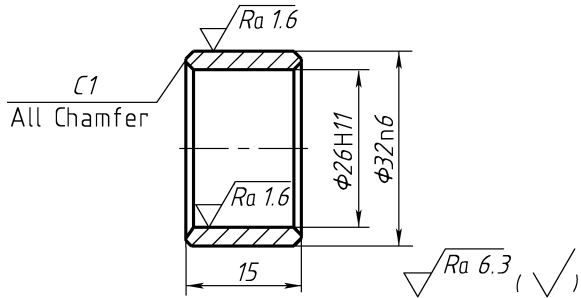
Platen 30 1 No. off



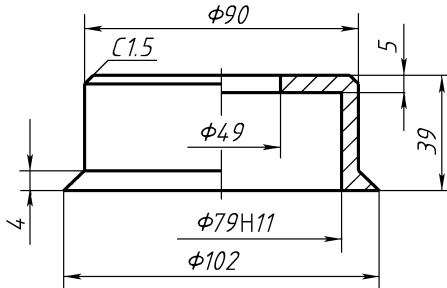
Shaft 45 1 No. off



Small barrel 45 3 No. off



Large barrel 45 1 No. off



注明：这是工件，在装配图中只需要用双点画线画出其轮廓。

Workpiece 45 3 No. off

Standard Parts 标准件

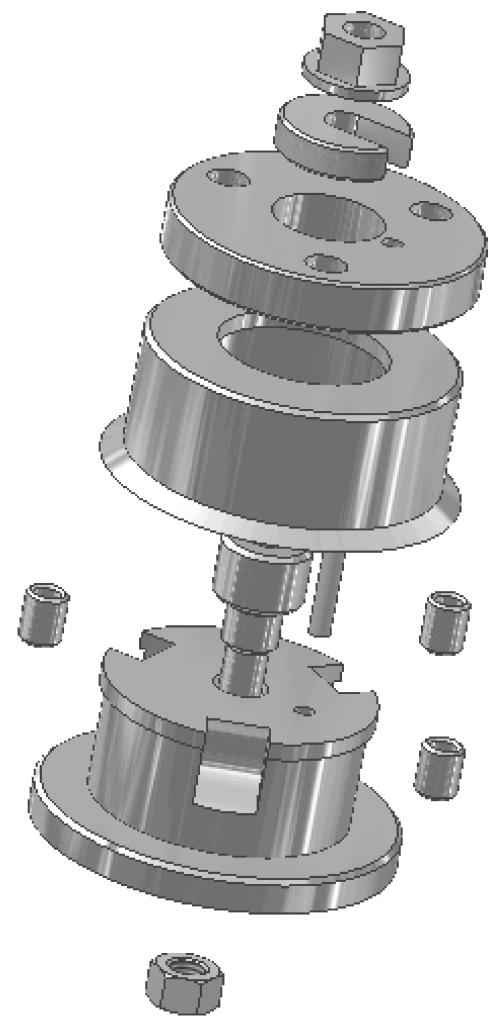
1. Parallel Pin 圆柱销规定标记为：销 GB/T 119.1—2000 6m6 × 35, 1 件 (圆柱销与底座配合为 $\phi 6 \frac{H7}{m6}$)。
2. Hexagon Nut 1 型六角螺母规定标记为：螺母 GB/T 6170—2015 M12, 1 件 (取 max 值)。

Class Stu No. Name

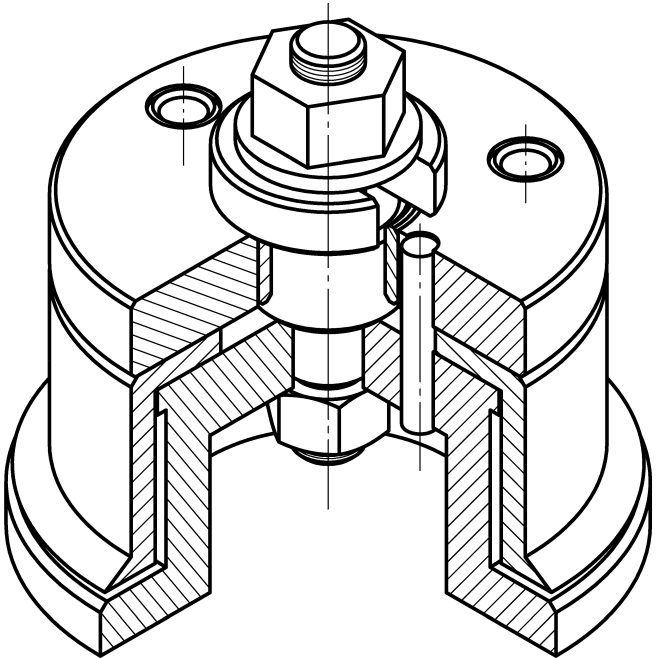
9-2 3D assembly 三维装配

According to the detail drawings of drill jig, draw 3D solid models using Inventor software, assemble solid models, and then create an exploded assembly drawing. 根据钻模零件图，用 Inventor 设计软件，分组进行零件实体造型（任务由组长指定），再装配成整体，生成分解图。

Exploded Assembly Drawing 分解图

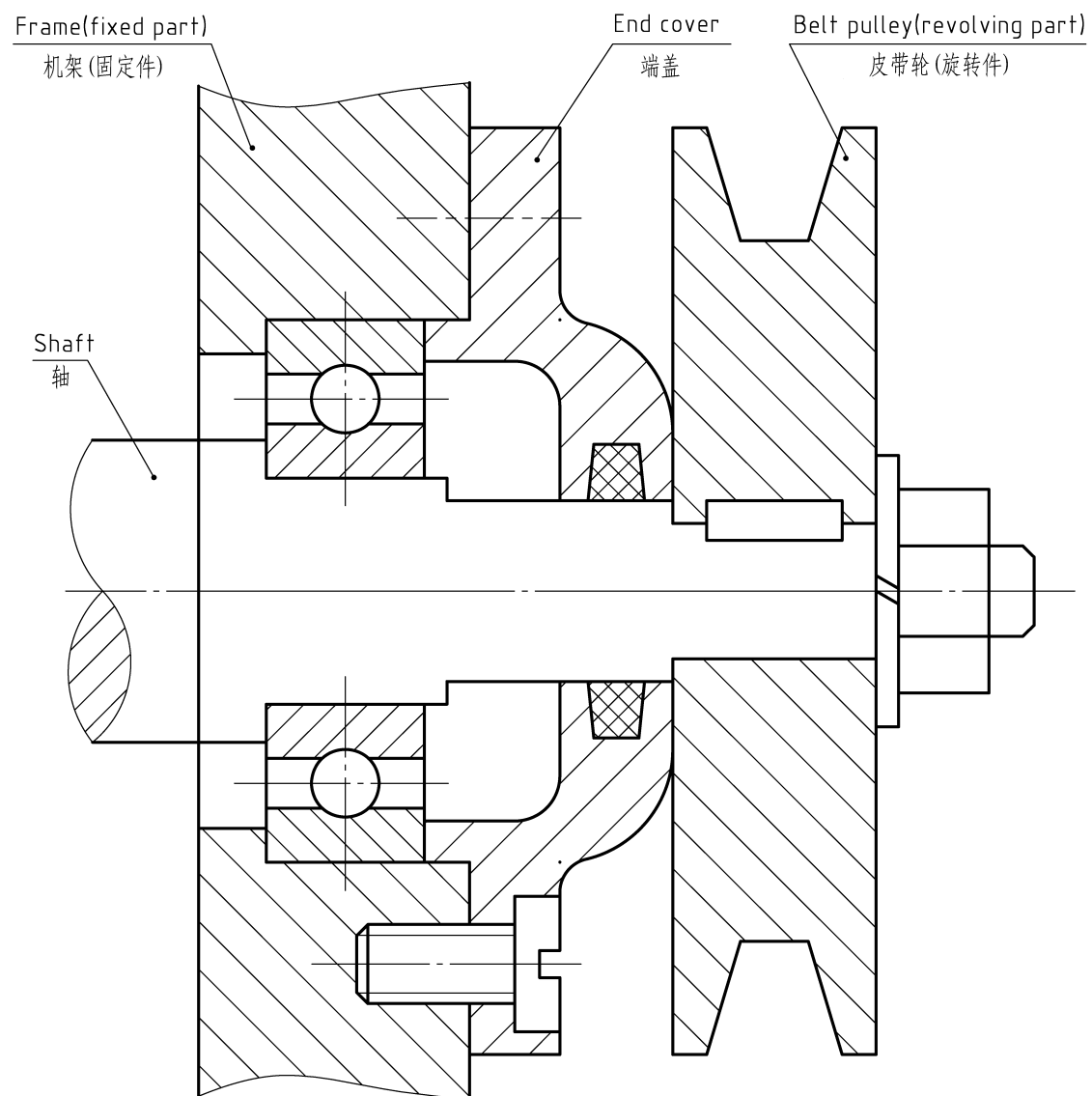


Assembly 装配体



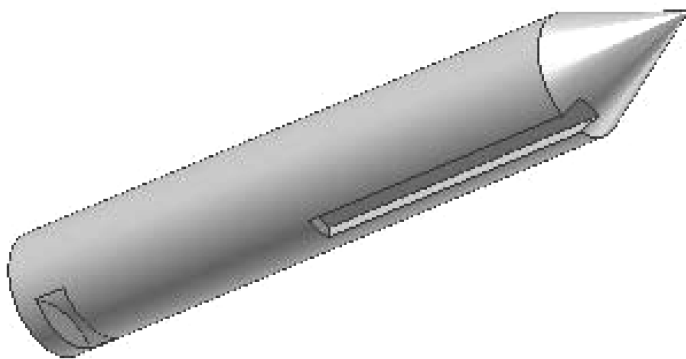
9-3 Correct assembly drawings 装配图改错

Find out errors of the following assembly drawings and draw the correct one on the right. 找出下方装配图中的错误，将正确的画在右边。

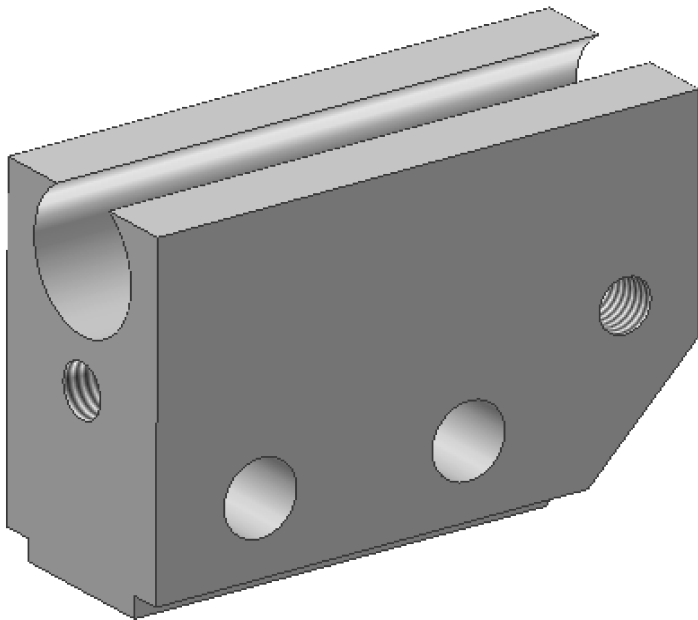


1. Read the following questions about the assembly drawing of “Miller tail”. 读“铣床尾架”装配思考题。
- (1) What are the purpose and the principle of miller tail? Which directions can “Center 5” move to? and how to fulfil? 铣床尾架的用途及工作原理是什么？顶尖5可以朝哪些方向移动？这些动作是如何完成的？
- (2) How many basic views and auxiliary views are used? What does each view represent mainly? where are no hatching in front view and side view? Why? 共有几个基本视图？几个辅助视图？各个视图的表达重点是什么？主视图和左视图上有哪些地方没画剖面线？为什么？
- (3) How many types of parts and how many standard parts are used? 共有零件多少种、多少个？其中标准件又是多少种？
- (4) Which parts are assembled on “Center block 3”? How are they connected with “Center block 3”? and what are the functions of each part? 有哪几个零件装在中心块3上？它们是怎样和中心块3连接的？各起什么作用？
- (5) How is “Screw 2” contacted with “Center 5”? and how is “Locating pin 4” contacted with “Center 5”? 螺钉2和顶尖5是如何接触的？定位销4和顶尖5又是如何接触的？
- (6) Describe the shape of “Center block 3”. How many unthreaded holes and threaded holes and what functions? Why is there a slot at the right lower direction? How many views at least are needed to represent “Center block 3” clearly? and then draw its detail drawing on a cross – section paper. 描述一下中心块3的形状，该形体上共有几个光孔？几个螺纹孔？其作用分别是什么？它的右下方为什么要开一个槽？想一想，最少要用几个什么样的视图才能将它表示清楚，并在方格纸上画出它的零件图。
- (7) Describe the shape of “Frame 1” and draw its detail drawing on a cross – section paper. 试分析架座1的形状，在方格纸上画出它的零件图。
- (8) Describe the shape of “Center 5”. which curved line is intersection line or intersection curve on the right end? and how to draw? How many views are needed to represent them clearly? 描述一下顶尖5的形状，右端哪条曲线是相贯线，哪条曲线是截交线，怎样求？要用哪几个视图才能将它表示清楚？
- (9) Analyze sizes and fit code, look up each tolerance (deviation) of “Center block 3”. 分析图上的尺寸和配合代号的意义，查出中心块各个公差（极限偏差值）。
- (10) Describe the subsequence of assembly and disassembly about “Miller tail”. 试述铣床尾架的装拆顺序。

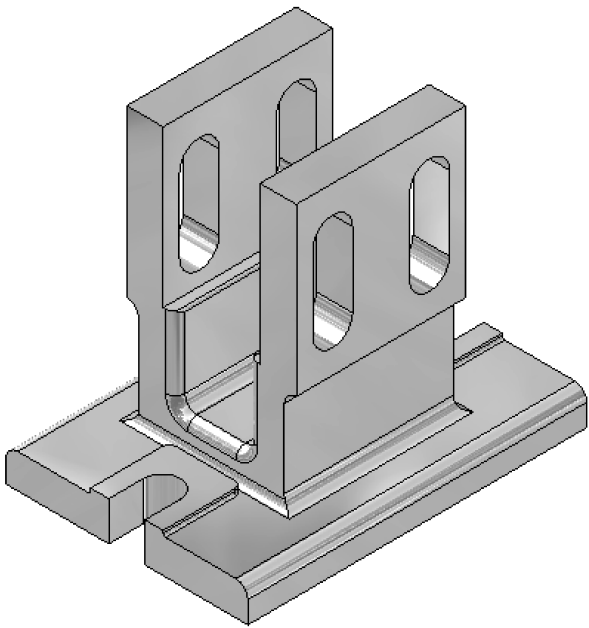
Center 顶尖



Center Block 中心块



Frame 架座



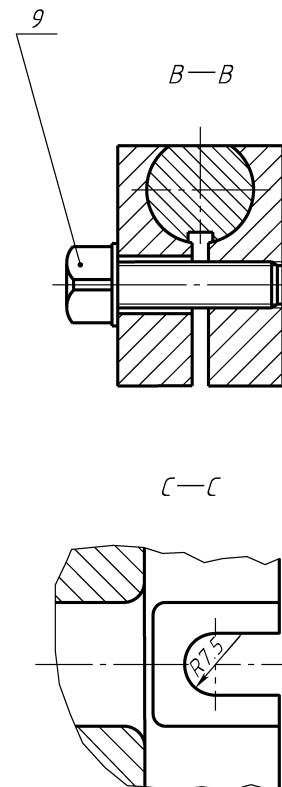
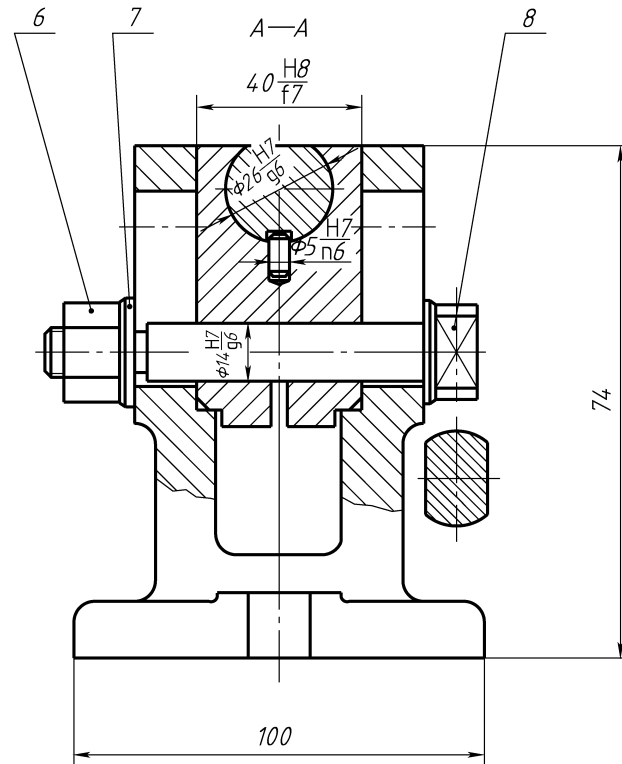
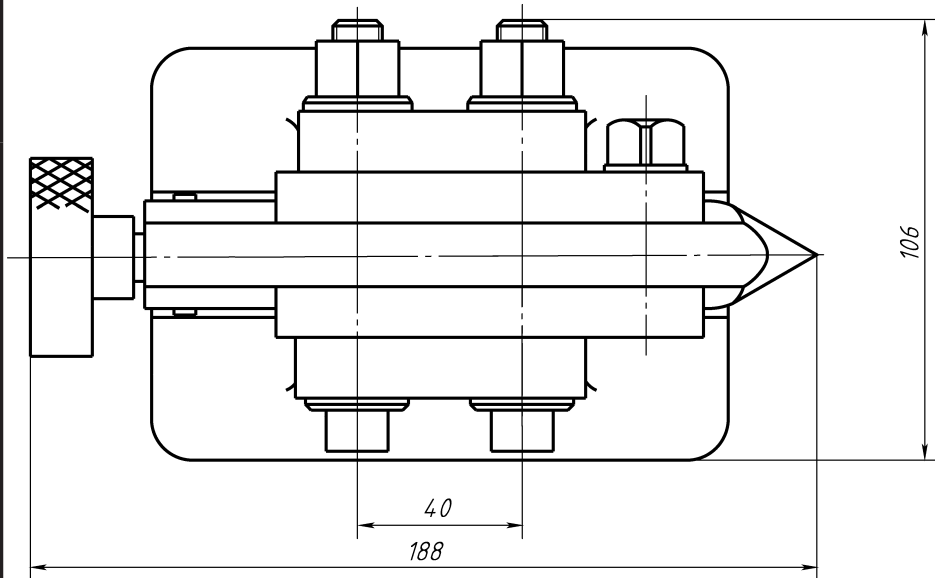
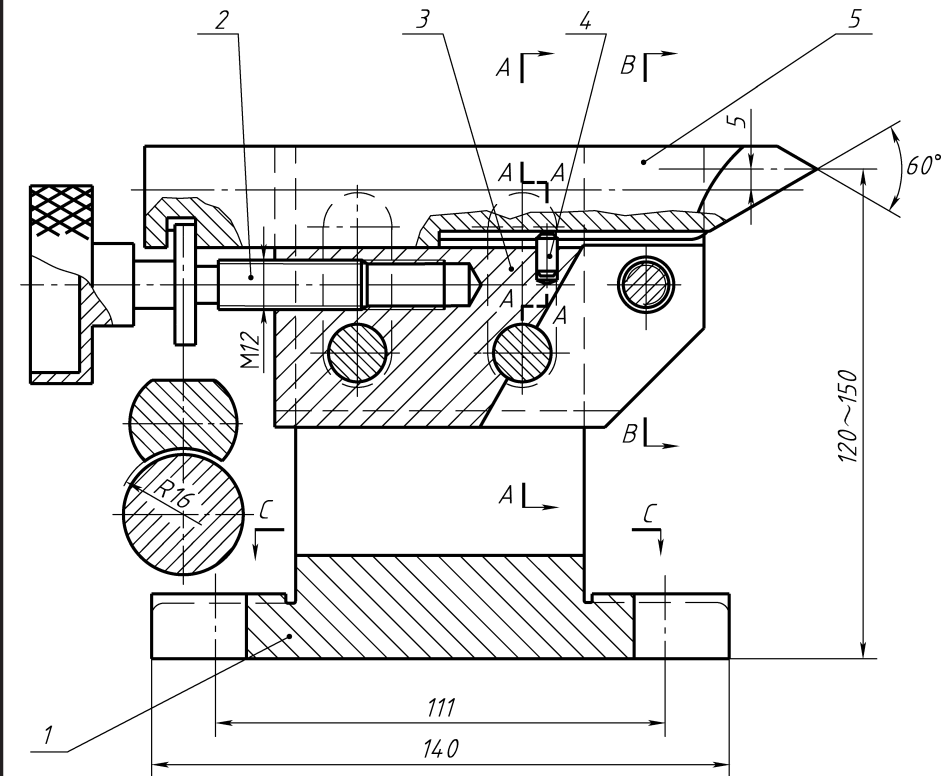
Class

Stu No.

Name

9-4 Read assembly drawings 读装配图 (续)

2. Read the assembly drawing of “Miller tail” and draw detail drawings of “Frame” and “Center block”. 读铣床尾架装配图并拆画架座、中心块的零件图。



工作原理

尾架用于支承工件，顶尖5应能上下左右调整。松开螺母6，可推动中心块3上下移动，即调整顶尖的高度，松开螺钉2，转动螺钉2，可左右移动顶尖。

9	XChWJ - 06	方头螺钉 M12 × 40	1	45	
8	XChWJ - 05	螺栓	2	Q235 A	
7		垫圈 12	4	Q235 A	GB/T 97. 2—2002
6		螺母 M12	2	Q235 A	GB/T 6170—2015
5	XChWJ - 04	顶尖	1	45	
4		销 A6 × 10	1	45	GB/T 119. 1—2000
3	XChWJ - 03	中心块	1	45	
2	XChWJ - 02	螺钉	1	Q235 A	
1	XChWJ - 01	架座	1	HT150	
序号	代号	名称及规格	数量	材料	备注
铣床尾架				比例	1:1
				共 张	第 张
制图				XChWJ—00	
审核					

Class

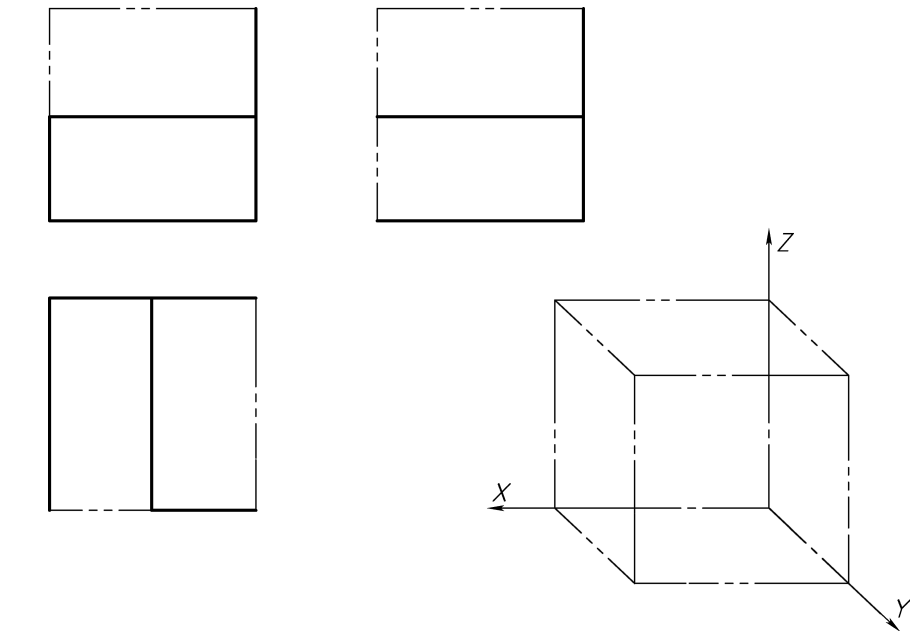
Stu No.

Name

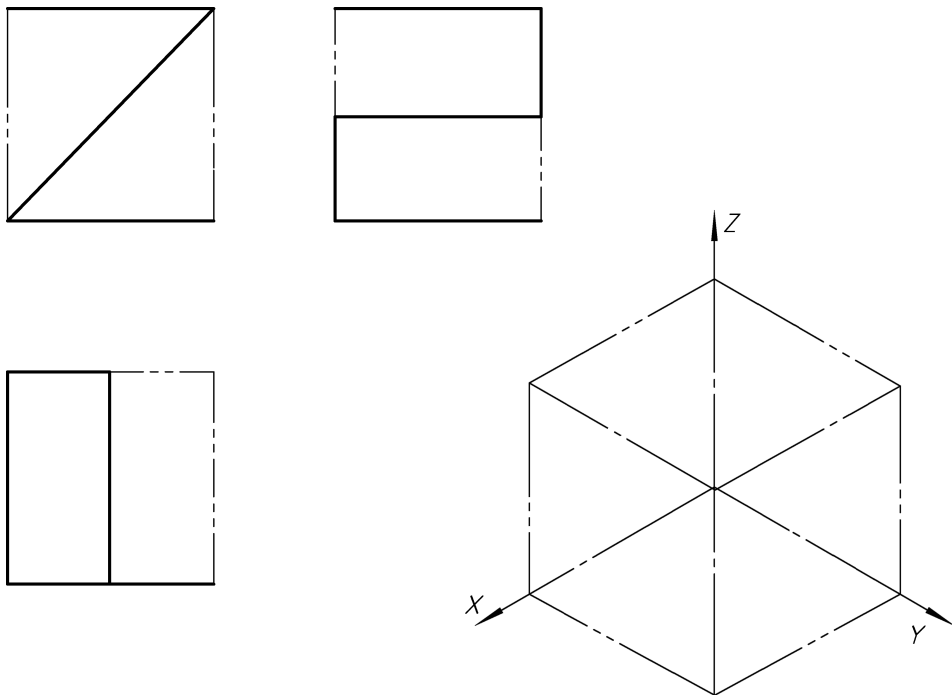
10-1 Pipeline engineering drawings 管线工程图

Draw pipeline axonometric projections in the following axonometric axis (Size measured from the pipeline projection, and scale 1:1). 根据管线投影图度量线段，以比例 1:1 画出管线轴测图。

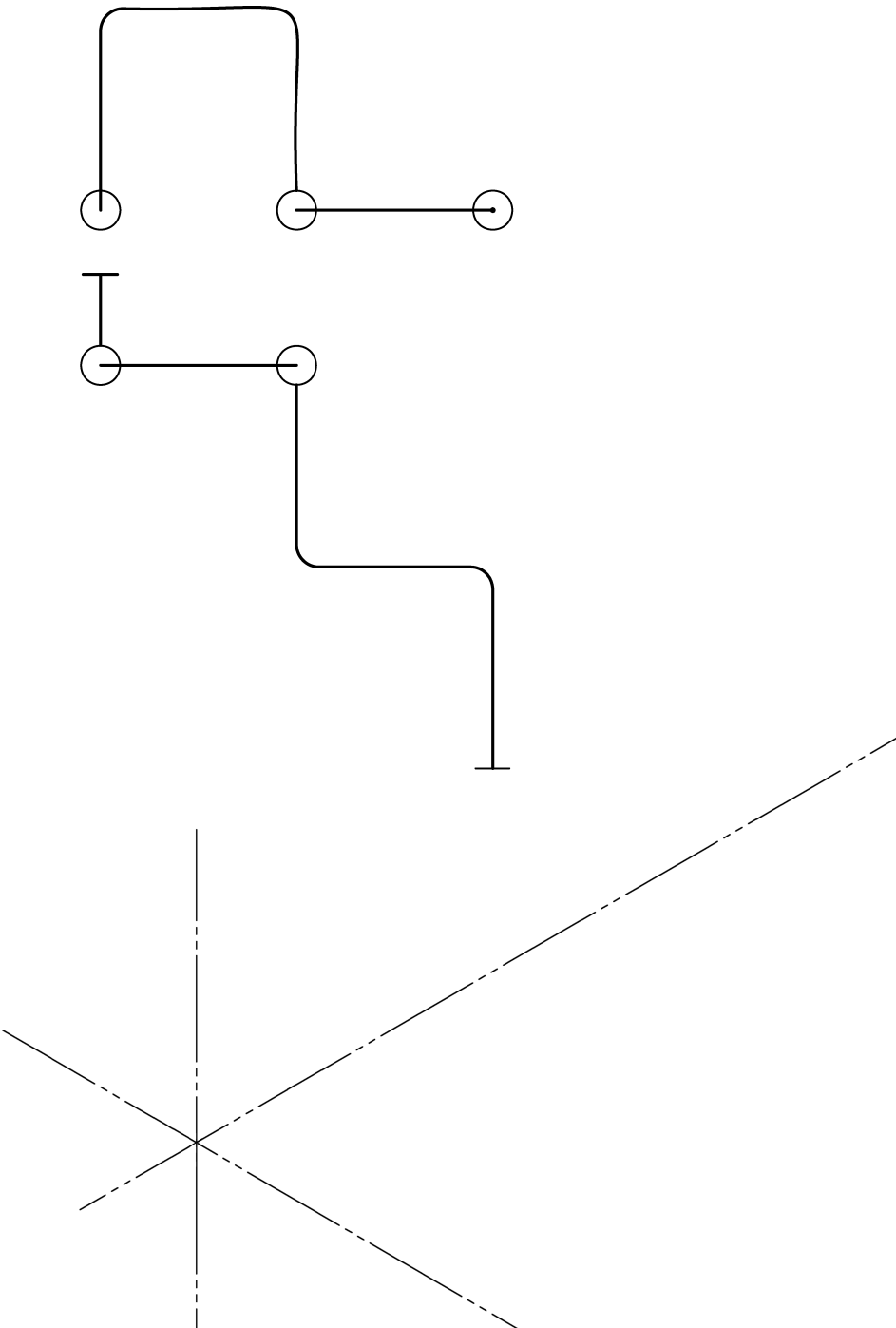
(1)

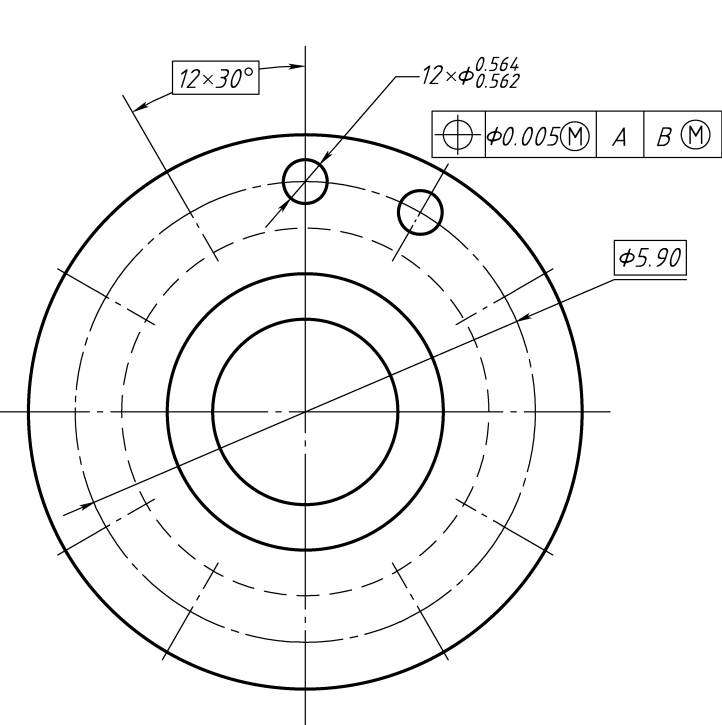


(2)

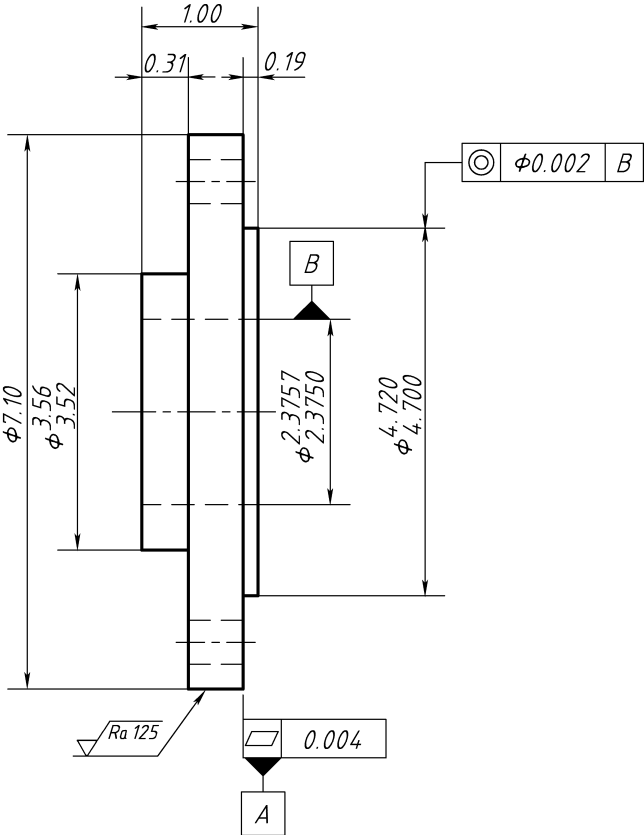


(3)





UNLESS OTHERWISE SPECIFIED
SURFACE FINISH TO BE $\sqrt{63}$



NORDALE MACHINES COMPANY
PITTSBURGH, PENNSYLVANIA

COVER PLATE

MATERIAL – AISI 1020

NO. REOD – 4

SCALE – 1 : 2

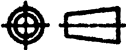
DRAWN – J. HELSEL

DATE – 4/20/99

CHECKED – C. JENSEN

A4-785

UNLESS OTHERWISE SPECIFIED
TOLERANCES $\pm .02$

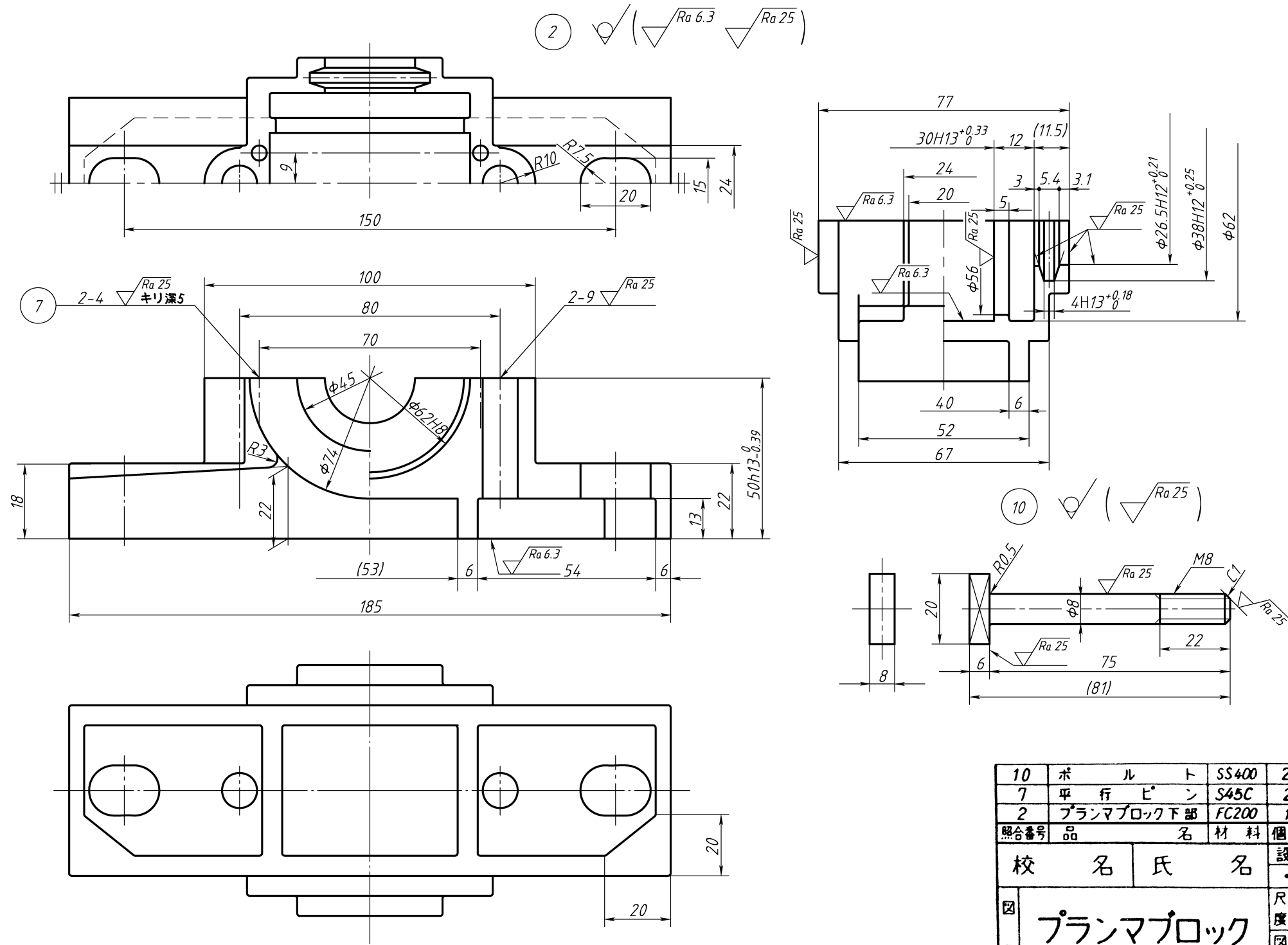


CHANGES

Class

Stu No.

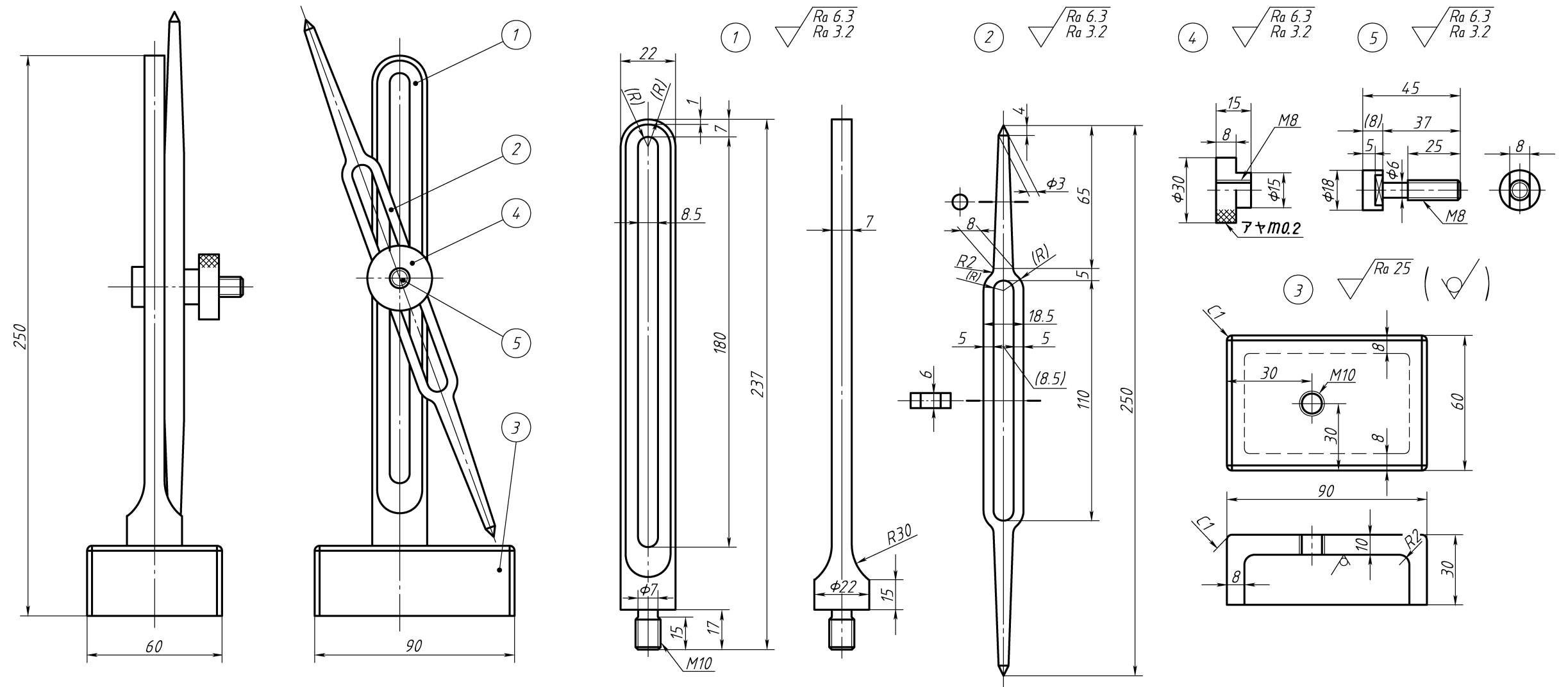
Name



10	ボルト	SS400	2	0.04	タキ	M8
7	平行ピン	S45C	2	0.001	ソ	JIS B1354
2	プランマブロック下部	FC200	1	1.2	ホイキ	JIS B1354
照合番号 品 名 材 料 個 数 質 量 工 程 記 事						
校 名 氏 名			設 計	製 図	写 真	
図 名			尺 寸	1:1	特 注	
プランマブロック			図 番	20029-2		

10-2 Foreign engineering drawing samples 国外工程图例 (续)

照合番号	品名	材料	個数	質量	工程	記事
1	トースカン柱	SF340A	1		タキ仕	面落シ
2	トースカン針	SK2	1		タキ仕	両端入れ
3	トースカン台	FC200	1		木枠仕	
4	ナット	S30C-D	1		キ仕	
5	ボルト	S30C-D	1		キ仕	



校 名	氏 名	設 計	製 図	写 図
		• •	• •	• •
図 名	トースカン	尺 度	1 : 1	投影法 
		図 番	20018	

Name

JIXIE GONGCHENG ZHITU JICHU XITIJI

地址：北京市百万庄大街22号
邮政编码：100037
电话服务
服务咨询热线：010-88379833
读者购书热线：010-88379649
网络服务
机工官网：www.cmpbook.com
机工官博：weibo.com/cmp1952
教育服务网：www.cmpedu.com
金书网：www.golden-book.com
封面无防伪标均为盗版



机工教育微信服务号

上架指导 画法几何 / 机械制图 / 计算机绘图系列

ISBN 978-7-111-56640-3

策划编辑◎赵志鹏 / 封面设计◎马精明

ISBN 978-7-111-56640-3



9 787111 566403 >

定价：39.80元